

# ACTIVITY BASED SAMPLING SUMMARY REPORT

## WORKER RECEPTORS

LIBBY, MONTANA OPERABLE UNIT 6

LIBBY, MONTANA

Prepared For:



The BNSF Railway Company  
825 Great Northern Boulevard, Suite 105  
Helena, Montana



Prepared By:

March 12, 2010

Project #: 5539-120



11 E. Superior St  
Suite 260  
Duluth, MN 55802  
P: 218.625.2332  
F: 218.625.2337  
[www.emr-inc.com](http://www.emr-inc.com)

## EXECUTIVE SUMMARY

The following document has been prepared to summarize the methods used and results of an Activity Based Sampling (ABS) event conducted in September 2008 at the request of the U.S. Environmental Protection Agency (EPA).

The ABS event was designed to evaluate potential exposure to two populations: BNSF Railway Company (BNSF) Maintenance of Way (MOW) workers (Workers) and the general public (Public). This report will focus on the sampling and results conducted on Worker population. Sampling and results of the Public assessment will be published under separate cover.

## INTRODUCTION

The Libby asbestos site has been on the National Priorities List since 2002 and encompasses the towns of Libby and Troy, Montana, the former W.R. Grace mine-site and several other Operable Units (OU). Property owned by the BNSF Railway Company (BNSF) has been designated OU6 and is defined geographically by the BNSF property boundaries and extent of contamination associated with the railyard and other Right of Way (ROW). Generally OU6 is as wide as the ROW (CDM, 2008) with the western and eastern limits being defined by limits of OU7 and OU4, respectively (Figure 1).

In preparation for the 2008 ABS event the following documents were prepared to govern the sampling, analysis and safety aspects of the project:

- Worker Receptor Sampling and Analysis Plan (Worker SAP) (AECOM, 2008a);
- Public Receptor Sampling and Analysis Plan (Public SAP) (AECOM, 2008b);
- Project-specific Health and Safety Plan (HSP) (EMR, 2008); and
- SAP analytical summaries.

Collectively these documents served to provide guidance in the collection and analysis of samples and to govern health and safety procedures. The focus of this report will be methods and procedures defined in the Worker SAP.

## SAMPLING AND ANALYTICAL

Personal air samples were collected from Workers to evaluate their potential exposure risk during rail maintenance activities. Camp, Dresser and McKey (CDM) personnel provided sampling oversight on behalf of the EPA.

All air samples were submitted to CDM for analysis by EMSL Analytical, Inc. (EMSL) utilizing ISO 10312 methods.



## RESULTS

A total of 12 Worker personal air samples were collected during the ABS event. All but three (3) samples (BA-00002, BA-00037, and BA-000038) met the target analytical sensitivity of 0.0024 structures/cubic centimeter. All worker air samples were non-detect for LA, Other Amphibole (OA) and Chrysotile.

A total of 8 blank samples were collected and submitted for analysis. Three of the blanks were not analyzed at the discretion of EMSL and were archived. All of the blanks were non-detect.

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	i
INTRODUCTION .....	i
SAMPLING AND ANALYTICAL .....	i
RESULTS .....	ii
LIST OF TABLES .....	v
LIST OF FIGURES .....	v
LIST OF APPENDICIES .....	v
LIST OF ACRONYMS .....	vi
1.0    SITE LOCATION .....	1
2.0    ABS PREPARATION .....	2
2.1 ABS Documents .....	2
2.1.1 Public Receptor Sampling and Analysis Plan .....	2
2.1.2 Health and Safety Plan .....	2
2.1.3 SAP Analytical Summaries .....	2
2.2 Site Specific Procedures .....	2
2.3 Personal Air Sampling Methods and Equipment .....	3
2.4 Sample Identification Numbers .....	3
3.0    DOCUMENTATION PROGRAM .....	4
3.1 Field Notes .....	4
3.2 Field Sample Data Sheets .....	4
4.0    SAMPLE ANALYSIS .....	5
4.1 Analytical Methods .....	5
4.1.1 TEM Analysis .....	5
5.0    SAMPLING PROGRAM .....	7
5.1 Sampling Areas .....	7
5.2 Deviations from SAP .....	7
5.3 Worker Air Sampling .....	8
5.4 Sample Identification Numbers .....	8
6.0    SAMPLING SUMMARY .....	9
6.1 September 17, 2008 .....	9





6.2 September 18, 2008.....	9
6.3 September 19, 2008.....	9
6.4 September 22, 2008.....	9
6.5 September 23, 2008.....	10
6.6 September 24, 2008.....	10
6.7 September 25, 2008.....	10
7.0 DISCUSSION OF RESULTS .....	11
7.1 Worker Personnel Air Sampling Results .....	11
7.2 Air Sample Blank Results.....	11
8.0 REFERENCES .....	12
9.0 STANDARD OF CARE .....	13

## LIST OF TABLES

Table 1. Summary of ABS Air Sampling Results

Table 2. Summary of Soil Sampling PLM-VE (Fine Fraction) Results

Table 3. Summary of Soil Sampling PLM-Gravimetric (Coarse Fraction) Results

## LIST OF FIGURES

Figure 1. Site Location Map

Figure 2. OU6 Overview Map Showing Commonly Referenced Features

Figure 3. Daily Sampling Area Map

## LIST OF APPENDICIES

Appendix A. Analytical Summaries

Appendix B. Field Notes

Appendix C. Field Sampling Data Sheets – Air

Appendix D. Field Change Orders

Appendix E. Worker Air Sample Laboratory Reports

## LIST OF ACRONYMS

ABS – Activity Based Sampling  
BNSF – BNSF Railway Company  
C – Chrysotile  
CDM – Camp, Dresser and McKee  
EMSL – EMSL Analytical, Inc  
EPA – U.S. Environmental Protection Agency  
FCO – Field Change Order  
FSDS – Field Sampling Data Sheets  
HSP – Health and Safety Plan  
ISO – International Organization for Standardization  
L/m – Liters per minute  
LA – Libby Amphibole  
MCE – Mixed Cellulose Ester  
MOW – Maintenance of Way  
MP – Mile Post  
NIOSH – National Institute for Occupational Safety and Health  
OA – Other Amphibole  
OU6 – Operable Unit 6  
PCM – Phase Contrast Microscopy  
PPE – Personal Protective Equipment  
QA/QC - Quality Assurance/Quality Control  
ROW – Right of Way  
RP – Rail Production  
s/cc – Structures per cubic centimeter  
SAP – Sampling and Analysis Plan  
SOP – Standard Operating Procedure  
TEM – Transmission Electron Microscopy

## 1.0 SITE LOCATION

The Libby asbestos site has been on the National Priorities List since 2002 and encompasses the towns of Libby and Troy, Montana, the former W.R. Grace mine-site and several other Operable Units (OU). Property owned by the BNSF Railway Company (BNSF) has been designated OU6 and is defined geographically by the BNSF property boundaries and extent of contamination associated with the railyard and other Right of Way (ROW).

In general, OU6 is as wide as the ROW (CDM, 2007). Although no formal geographic boundaries have been established for the western or eastern limits of OU6, EPA's agent, Camp, Dresser and McKee (CDM) has used the limits of OU4 to define the east side boundary and the limits of OU7 defined the west side boundary (Figure 1) (CDM, 2007). These limits roughly correlate to BNSF Mile Post (MP) 1301.5 on the east to MP 1342 on the west (Figure 2).

OU6 is encompassed by BNSF's Kootenai River Subdivision that extends westward from Whitefish, Montana to Sandpoint, Idaho. Approximately 40 trains per day pass over the Kootenai River Subdivision. The portion of the Kootenai River subdivision within OU6 is single track with passing sidings that allow the passing of trains traveling in opposite directions. Passing sidings within OU6 are located at following locations (from east to west) (Figure 2):

- Riverview (MP 1306.9)
- Ripley (MP 1312.2)
- Libby (MP 1319.6)
- Kootenai Falls (MP 1331.3)
- Troy (MP 1337.9)

Two small railyards are present at Libby and Troy (Figure 2) and an industrial spur is present at the east end of Libby. From MP 1301.5 to approximately 1307.5 the BNSF ROW parallels Fisher River and then follows the Kootenai River from 1307.5 to the west end of OU6 (Figure 2).

## **2.0 ABS PREPARATION**

### **2.1 ABS Documents**

In preparation for the 2008 Activity Based Sampling (ABS) event, a series of documents were prepared to govern the sampling, analysis and safety aspects of the project. The following is a brief description of purpose of each document that pertains to the Worker Receptor portion of the ABS event.

#### **2.1.1 PUBLIC RECEPTOR SAMPLING AND ANALYSIS PLAN**

The Worker Receptor Sampling and Analysis Plan (Worker SAP) (AECOM, October, 2008a) detailed the methods and procedures that were utilized during the collection of personal air samples of BNSF Maintenance of Way (MOW) workers. The focus of the Worker SAP was to assess the potential exposure of BNSF workers to airborne Libby Amphibole (LA) during rail maintenance activities.

#### **2.1.2 HEALTH AND SAFETY PLAN**

A project-specific Health and Safety Plan (HSP) was developed to cover safety and Personal Protective Equipment (PPE) issues for personnel involved with the sampling activities (EMR, 2008). The HSP was not developed as a site specific plan since the work sites would be changing daily. In addition to the HSP, all sampling personnel attended daily BNSF safety briefing that included job specific details including planned work activities, area specific hazards and weather forecasts.

#### **2.1.3 SAP ANALYTICAL SUMMARIES**

A SAP analytical summary was developed for samples collected under the Worker SAP. The analytical summary was approved by the EPA, EPA agents and contracted laboratories. The purpose of the analytical summary was to condense the analytical parameters specified in the Worker SAP into an easily referenced guide for the laboratory. The approved Worker Receptor analytical summary is included in Appendix A.

### **2.2 Site Specific Procedures**

Prior to initiating ABS sampling, EMR field staff received training from CDM on Field Sample Data Sheet (FSDS) procedures that are specific to the Libby Superfund Site. The FSDS training did not follow a specific Standard Operating Procedure (SOP), but rather focused on the procedures to be followed for completion of FSDS forms and the submission of air and soil samples for analysis.



## 2.3 Personal Air Sampling Methods and Equipment

Personal air samples were collected to evaluate air quality for BNSF workers (Workers). Two Worker personal air samples were collected each work day to evaluate potential exposure of BNSF maintenance workers to fiber releases. The samples were split between machine operator and laborer positions within the gang.

Personal air samples were collected using Gillian BDX II personal air pumps equipped with Zefon 25mm Phase Contrast Microscopy (PCM) cassettes with 0.8  $\mu\text{m}$  Mixed Cellulose Ester (MCE) filters. Personal air samples were collected at flow rates that ranged between 1.4 Liters/minute (L/m) and 2.8 L/m, as determined by testing with a calibrated rotameter at the beginning and ending of the day. These cassettes were utilized for both PCM analysis by National Institute for Occupational Safety and Health (NIOSH) Method 7400 and Transmission Electron Microscopy (TEM) analysis by the International Organization for Standardization (ISO) Method 10312. All personal air samples requiring fixed laboratory analysis were submitted to CDM for analysis by EMSL Analytical, Inc (EMSL). Copies of the FSDSs for the Worker Receptor personal air samples are found in Appendix B.

It should be noted that additional matrices were sampled and other data, including meteorological data and field notes, was gathered during the ABS event. In order to avoid redundancies, these additional data sets are discussed in the *2008 Activity Based Sampling Summary Report – Public Receptors* (EMR, 2009).

## 2.4 Sample Identification Numbers

All samples were assigned a unique sample identification consisting of a prefix followed by a five digit number that signify the order in which the samples were collected. All sample identifications were pre-assigned by CDM. Air samples were designated by a BA prefix while the Location IDs used during the collection of air samples (AD-005568) were also assigned by CDM.



## 3.0 DOCUMENTATION PROGRAM

### 3.1 Field Notes

Two sets of field notes were collected by EMR personnel, one maintained by the soil sampling crew while the other was maintained by personnel outside the work area. These notes apply to both the Worker and Public Receptor portions of the ABS event and contain details regarding general field conditions, sample location information, soil descriptions, and timing of work completed. All notes were kept in bound field books and copies are found in Appendix B.

### 3.2 Field Sample Data Sheets

Information for each sample collected was logged on FSDSs that were provided by CDM. Three types of FSDSs were provided by CDM: 1) personal air samples; 2) stationary air samples; and 3) soil samples. FSDSs were completed by EMR personnel using CDM-assigned sample numbering labels as well as sample specific data. Personal air sample FSDSs are found in Appendix B.

Additional documentation of field events and sampling conditions was collected during the ABS event. In order to avoid redundancies, these additional data sets are discussed in the *2008 Activity Based Sampling Summary Report – Public Scenario* (EMR, 2010).

## 4.0 SAMPLE ANALYSIS

### 4.1 Analytical Methods

All samples collected during the ABS event were submitted to the CDM Libby, Montana office. After approval of the analytical summary sheets, CDM generated chain of custody forms and submitted all Worker air samples to EMSL's Libby, Montana laboratory. The following is a brief discussion of the analytical methods used in the analysis of the ABS samples.

#### 4.1.1 TEM ANALYSIS

Worker air samples were submitted for TEM analysis using the International Organization for Standardization (ISO) 10312 methodology. This method determines and counts the type(s) of asbestos structure present, but sometimes cannot discriminate between individual fibers of amphibole and non-asbestos analogues of the same amphibole mineral. The method categorizes structures of various lengths and widths into "bins" to count the various fractions of Libby Amphibole (LA), Other Amphibole (OA) and Chrysotile (C). The method specifies six bins that are characterized as follows:

- Bin A: All LA, OA and C fibers with a length to width aspect ratio less than 5:1;
- Bin B: All LA, OA and C fibers with a length to width aspect ratio greater than or equal to 5:1 and length less than 0.5  $\mu\text{m}$ ;
- Bin C: All LA, OA and C fibers with an a length to width aspect ratio greater than or equal to 5:1 and width less than or equal to 0.5  $\mu\text{m}$ ;
- Bin D: All LA, OA and C fibers with a length to width aspect ratio greater than or equal to 5:1, with fiber length between 0.5  $\mu\text{m}$  and 5  $\mu\text{m}$ ;
- Bin E: All LA, OA and C fibers with a length to width aspect ratio greater than or equal to 5:1, length between 5 and 10 microns and width less than or equal to 0.5  $\mu\text{m}$ ; and
- Bin F: All LA, OA and C fibers with a length to width aspect ratio greater than or equal to 5:1, length greater than 10  $\mu\text{m}$  and width less than or equal to 0.5  $\mu\text{m}$ .

Results are expressed in units of structures per cubic centimeter (s/cc) (Table 1).

A total of 4 worker air samples required indirect preparation methods due to overloading of the sample filter. All other samples were directly prepared.

Overloading can be caused by a number of environmental factors including the intake of high concentrations of natural airborne dust, high concentrations of airborne pollen or seeds and clothing fibers. The purpose of indirect preparation is to remove any organic material that was recovered during the sampling process to allow for accurate analysis of the sample. Indirect preparation includes the following steps:



- Organic materials (including the filter) are oxidized (ashed) using a plasma oxidation chamber;
- the materials that survive the oxidation process are re-suspended in water and then re-deposited on a new filter;
- The new filter is analyzed using the same methods as a direct preparation sample.

## 5.0 SAMPLING PROGRAM

### 5.1 Sampling Areas

EMR personnel consulted with the BNSF Rail Production (RP) -15 and RP-21 Roadmasters on a daily basis to determine the planned activities and the exact work area in which sampling would take place. On several days a particular gang and its personnel would complete multiple projects. Since Worker sampling was initiated at the beginning of the work day and continued until the end, Worker data represents the conditions throughout a work day instead of a specific project.

### 5.2 Deviations from SAP

The ABS event was conducted in accordance with the procedures described in the Worker SAPs except when field conditions warranted a deviation. The following is a discussion of deviations from the Worker SAP that were incorporated into the sampling process based on field conditions. All deviations were documented on Field Change Order (FCO) forms and those that apply to the Worker SAP are discussed below and are found in Appendix C. Many of the deviations resulted from determining actual field conditions versus those speculated during the SAP development.

- FCO #17-1: A flow rate of 5 L/m could not be achieved with the personal pumps. Reduced flow rates increased the duration of sampling events from 4 hours to 8 hours.
- FCO #17-3: The SAP assumed that no train traffic would pass through the sampling area. On day 1 train traffic was allowed to pass through the sampling area during maintenance and sampling activities. All subsequent trains passing through the sampling area were recorded in the field book.
- FCO #17-6: Worker sampling event duration is variable and is not under the control of the sampling team. The SAP called for maximum sample duration of 4 hours for workers. Pumps were placed on workers at the beginning of a shift and retrieved at the end of the shift. The increased duration may result in filter overloading.
- FCO #18-2: Assessed and reduced Worker air sample flow rate from 2.8L/m to 1.0 L/m to reduce filter overloading.
- FCO #18-3: Day 1 field setting was extremely dry and significant dust was created by vehicles passing through the sampling area on an adjacent access road. Day 2 conditions featured the same soil moisture conditions but overall dust levels were lower since this site did not have an access road.



- FCO # 19-1: Scheduled maintenance work was less than 1,000 feet in length. Therefore, worker ABS sampling period limited compared to Day 1 and Day 2 sampling. Modified sampling plan to suit shortened maintenance length and duration.
- FCO # 22-1: The SAP called for a suspension of work during precipitation events. The SAP was modified to continue sampling during the light to moderate rainfall event that occurred this day.

Since the FCOs represent actual field conditions, these deviations will likely be incorporated into future ABS events and SAP revisions.

### 5.3 Worker Air Sampling

The breathing space air quality of BNSF personnel involved with railroad maintenance was evaluated with personal air sampling techniques as described below. All personal air samples were collected using the equipment and procedures described in Section 3.3.1. The collection locations of personal air samples are not depicted on Figures 4-10 since the sampled personnel were not stationary.

Two personal air samples were collected each work day to evaluate potential exposure of BNSF maintenance workers to fiber releases. A total of 14 samples were collected during the ABS event. The samples were split between machine operator and laborer positions within the gang. All laborer positions were exposed to the ambient air and sampling of machine operators was biased towards machines that did not have fully enclosed cabs. Since maintenance work could not be interrupted, the sampling period lasted the duration of the working shift.

Blank air samples were collected throughout the ABS event. The blanks are applicable to air samples collected under both the Worker and Public Receptor SAPs.

### 5.4 Sample Identification Numbers

All samples were assigned a unique sample identification consisting of a prefix followed by a five digit number that signify the order in which the samples were collected. All sample identifications were pre-assigned by CDM. Air samples were designated by a BA prefix (i.e. BA-00001) and the location IDs AD-005568.

## 6.0 SAMPLING SUMMARY

The following is a discussion of the work areas and daily sampling activities that occurred during the ABS event. The following discussion contains gaps in the personal air sampling numbering since additional samples were collected during the Public Receptor portion of the ABS event. The results of the Public Receptor sampling are discussed under separate cover in the *Activity Based Sampling Summary Report – Public Receptors* (EMR, 2010).

### 6.1 September 17, 2008

Sampling focused on RP-15 that was relaying approximately 2,000 feet of rail on wood ties at MP 1312, approximately 7.5 miles east of Libby (Figure 3). The following samples were collected (Table 1):

- Two (2) worker personal air samples BA-00001 and BA-00002 collected from a BNSF laborer and machine operator, respectively; and
- One (1) air sample blank BA-00010.

### 6.2 September 18, 2008

Sampling focused on RP-15 that was replacing approximately 2,900 feet of rail on wooden ties at Kootenai Falls Siding (MP 1331.5). This work site was approximately 12½ miles west of Libby (Figure 3). The following samples were collected:

- Two (2) worker personal air samples BA-00011 and BA-00012 collected from a BNSF machine operator and laborer, respectively; and
- One (1) air sample blank BA-00020.

### 6.3 September 19, 2008

Sampling focused on RP-15 that replaced 610 feet of rail on wooden ties at Kootenai Falls Siding (MP 1331). This work site was approximately 12 miles west of Libby (Figure 3). The following samples were collected:

- Two (2) worker personal air samples BA-00021 and BA-00022 collected from a BNSF laborer and machine operator, respectively; and
- One (1) air sample blank BA-00027.

### 6.4 September 22, 2008

Sampling focused on RP-15 that replaced 1,400 feet of rail on wooden ties east of Kootenai Falls Siding (MP 1329.5). This work site was approximately 10 miles west of Libby (Figure 3). The following samples were collected:

- Two (2) worker personal air samples BA-00029 and BA-00030 collected from a BNSF laborer and machine operator, respectively; and
- One (1) air sample blank BA-00036.

#### **6.5 September 23, 2008**

Sampling focused on RP-21 that replaced 1,000 feet of rail on concrete ties at the east end of Troy (MP 1337). This work site was approximately 1 mile east of Troy (Figure 3). The following samples were collected:

- Two (2) worker personal air samples BA-00037 and BA-00038 collected from a BNSF laborer and machine operator, respectively; and
- One (1) air sample blank BA-00046.

#### **6.6 September 24, 2008**

Sampling focused on RP-21 that replaced 1,300 feet of rail on concrete ties at the east end of the BNSF Troy yard (MP 1339.5). This work site was approximately 1.5 miles west of Troy (Figure 3). The following samples were collected:

- Two (2) worker personal air samples BA-00047 and BA-00048 collected from a BNSF laborer and machine operator, respectively; and
- Two (2) air sample blanks BA-00056 and BA-00057.

This project completed RP-21's work within OU6.

#### **6.7 September 25, 2008**

Sampling focused on RP-15 that replaced 600 feet of rail on wooden ties east of the Troy (MP 1341). This work site was approximately 3.6 miles west of Troy (Figure 3). The following samples were collected:

- Two (2) worker personal air samples BA-00058 and BA-00059 collected from a BNSF laborer and machine operator, respectively; and
- One (1) air sample blank BA-00069.

This project completed RP-15's work within OU6.



## 7.0 DISCUSSION OF RESULTS

Worker air sample results are discussed below and summarized in Table 1. Complete laboratory reports and chain of custody forms are found in Appendix D.

### 7.1 Worker Personnel Air Sampling Results

A total of 14 worker personal air samples were collected during the ABS event. All samples were submitted for analysis via ISO 10312. Analytical sensitivity ranged from 0.00211 structures per cubic centimeter (s/cc) to 0.00769 s/cc. All but three 3 samples (BA-00002, BA-00037, and BA-000038) met the target analytical sensitivity of 0.0024. All samples were non-detect for LA, Other Amphibole (OA) and Chrysotile (Table 1).

### 7.2 Air Sample Blank Results

A total of 8 blank samples were collected and submitted for analysis. Three of the blanks were not analyzed at the discretion of EMSL and were archived. All of the blanks were non-detect (Table 1).



## 8.0 REFERENCES

AECOM, 2008a, *Rail Maintenance Worker Receptor Activity-Based Sampling and Analysis Plan - Operable Unit 6*. October, 2008

AECOM, 2008b, *Rail Maintenance Public Receptor Activity-Based Sampling and Analysis Plan - Operable Unit 6*. September, 2008.

EMR, 2008, *Health and Safety Plan – BNSF Maintenance of Way Activity Based Sampling, Libby, Montana*. September, 2008.

EMR, 2010, *Activity Based Sampling Summary Report – Public Receptors*. March, 2010.





## 9.0 STANDARD OF CARE

The data generated and conclusions provided are based upon the scope of work performed. All work was conducted in a manner consistent with customary principles in the fields of science and engineering. EMR is not responsible for the independent conclusions, opinions, or recommendations made by others based on the data presented in this report. No other warranty, expressed or implied, is made.

The results reported and any opinions reached by EMR are for the benefit of the client and unless agreed to by EMR in writing, are not to be disclosed to or relied upon by any third party. The results and opinions set forth by EMR in this report will be valid as of the date of the report. EMR assumes no obligation to advise you of any changes that may later be brought to our attention.

EMR, Inc., as environmental consultants, respectfully submits this report.

The preceding report was prepared and reviewed by the following EMR personnel.

Author:

A handwritten signature in black ink, appearing to read "Scott Carney".

Scott Carney, PG, CHMM  
Senior Geologist

March 12, 2010  
Date

Reviewed By:

A handwritten signature in black ink, appearing to read "Dave Welch".

Dave Welch, L.G.  
Project Geologist

March 12, 2010  
Date



## TABLES

Table 1. Summary of ABS Air Sampling Results  
Activity Based Sampling Summary Report - Worker Receptor  
BNSF RP-15/RP-21  
BNSF Kootenai River Subdivision  
September 17-25, 2008  
EMR Project #5539-120

Index ID	Sample Group	Sample Date	Analysis Date	Sample Type	Volume (L)	Sensitivity	Libby Amphibole s/cc	Other Amphibole s/cc	Chrysotile s/cc	Personnel Name	Job	Milepost
BA-00001	Property	9/17/2008	4/16/2009	Worker	1344	0.00211	<DL	<DL	<DL	Eric Pavlack	Laborer	1312
BA-00002	Property	9/17/2008	4/16/2009	Worker	1333	0.00426	<DL	<DL	<DL	Victor Bachmeier	Cribber Operator	1312
BA-00010	Blank	9/17/2008	10/31/2008	Blank	0	Blank	0	0	0	NA	NA	1312
BA-00011	Property	9/18/2008	4/16/2009	Worker	706	0.00233	<DL	<DL	<DL	Victor Bachmeier	Cribber Operator	1331.5
BA-00012	Property	9/18/2008	4/16/2009	Worker	687	0.00239	<DL	<DL	<DL	Eric Pavlack	Laborer	1331.5
BA-00020	Blank	9/18/2008	10/31/2008	Blank	0	Blank	0	0	0	NA	NA	1331.5
BA-00021	Property	9/19/2008	4/16/2009	Worker	988	0.00231	<DL	<DL	<DL	Eric Pavlack	Laborer	1331
BA-00022	Property	9/19/2008	4/17/2009	Worker	1016	0.00224	<DL	<DL	<DL	Victor Bachmeier	Cribber Operator	1331
BA-00027	Blank	9/19/2008	10/31/2008	Blank	0	Blank	0	0	0	NA	NA	1331
BA-00029	AD-005568	9/22/2008	4/17/2009	Worker	1145	0.00235	<DL	<DL	<DL	Eric Pavlack	Laborer	1329.8
BA-00030	AD-005568	9/22/2008	4/17/2009	Worker	1145	0.00235	<DL	<DL	<DL	Victor Bachmeier	Cribber Operator	1329.8
BA-00036	Blank	9/22/2008	Archived	Blank	0	Blank	0	0	0	NA	NA	1329.8
BA-00037	AD-005568	9/23/2008	4/17/2009	Worker	739	0.00769	<DL	<DL	<DL	Matt Stashick	Laborer	1337
BA-00038	AD-005568	9/23/2008	4/17/2009	Worker	890	0.00319	<DL	<DL	<DL	Dale Johnson	Cribber Operator	1337
BA-00046	AD-005568	9/23/2008	Archived	Blank	-	-	-	-	-	NA	NA	1337
BA-00047	AD-005568	9/24/2008	4/17/2009	Worker	1154	0.00233	<DL	<DL	<DL	Matt Stashick	Laborer	1339.5
BA-00048	AD-005568	9/24/2008	4/17/2009	Worker	1165	0.00231	<DL	<DL	<DL	Karl Harms	Clip Remover Machine	1339.5
BA-00056	AD-005568	9/24/2008	Archived	Blank	0	-	-	-	-	NA	NA	1339.5
BA-00057	AD-005568	9/24/2008	Archived	Blank	0	-	-	-	-	NA	NA	1339.5
BA-00058	AD-005568	9/25/2008	4/17/2009	Worker	510	0.00232	<DL	<DL	<DL	Eric Pavlack	Laborer	1341
BA-00059	AD-005568	9/25/2008	4/17/2009	Worker	501	0.00236	<DL	<DL	<DL	Bryce Vandenberg	Scrap Crane Operator	1341
BA-00069	AD-005568	9/25/2008	11/6/2008	Blank	0	Blank	0	0	0	NA	NA	1341

NA - Not Applicable  
DL - Detection Limits



## FIGURES



LIMITS OF  
INVESTIGATION  
OU7 BOUNDARY

LIMITS OF  
INVESTIGATION  
OU6 BOUNDARY

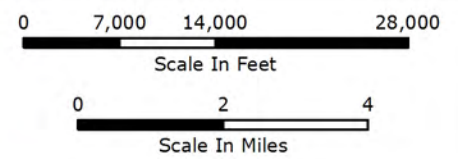


Figure 1  
Site Location Map

Activity Based Sampling  
Summary Report

--  
*Worker Receptors*

BNSF Kootenai River Sub  
Libby, Montana



Project Number: 5539-140  
Date: March 8, 2010  
Drafted By: KLA  
Reviewed By: SJC  
Reference: Lincoln Topo MDRNRCS



11 E. Superior St. Suite #260  
Duluth, MN 55802  
Phone: 218.625.2332  
Fax: 218.625.2337





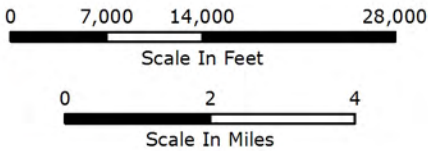
Figure 2  
OU6 Overview Map Showing  
Commonly Referenced Features

Activity Based Sampling  
Summary Report  
--  
Worker Receptors

BNSF Kootenai River Sub  
Libby, Montana

**Legend**

- Approximate Milepost Locations
- Rail Sidings
- BNSF Railway
- BNSF Yard



Project Number: 5539-140  
Date: March 8, 2010  
Drafted By: KLA  
Reviewed By: SJC  
Reference: 2006 Lincoln Aerial



11 E. Superior St. Suite #260  
Duluth, MN 55802  
Phone: 218.625.2332  
Fax: 218.625.2337



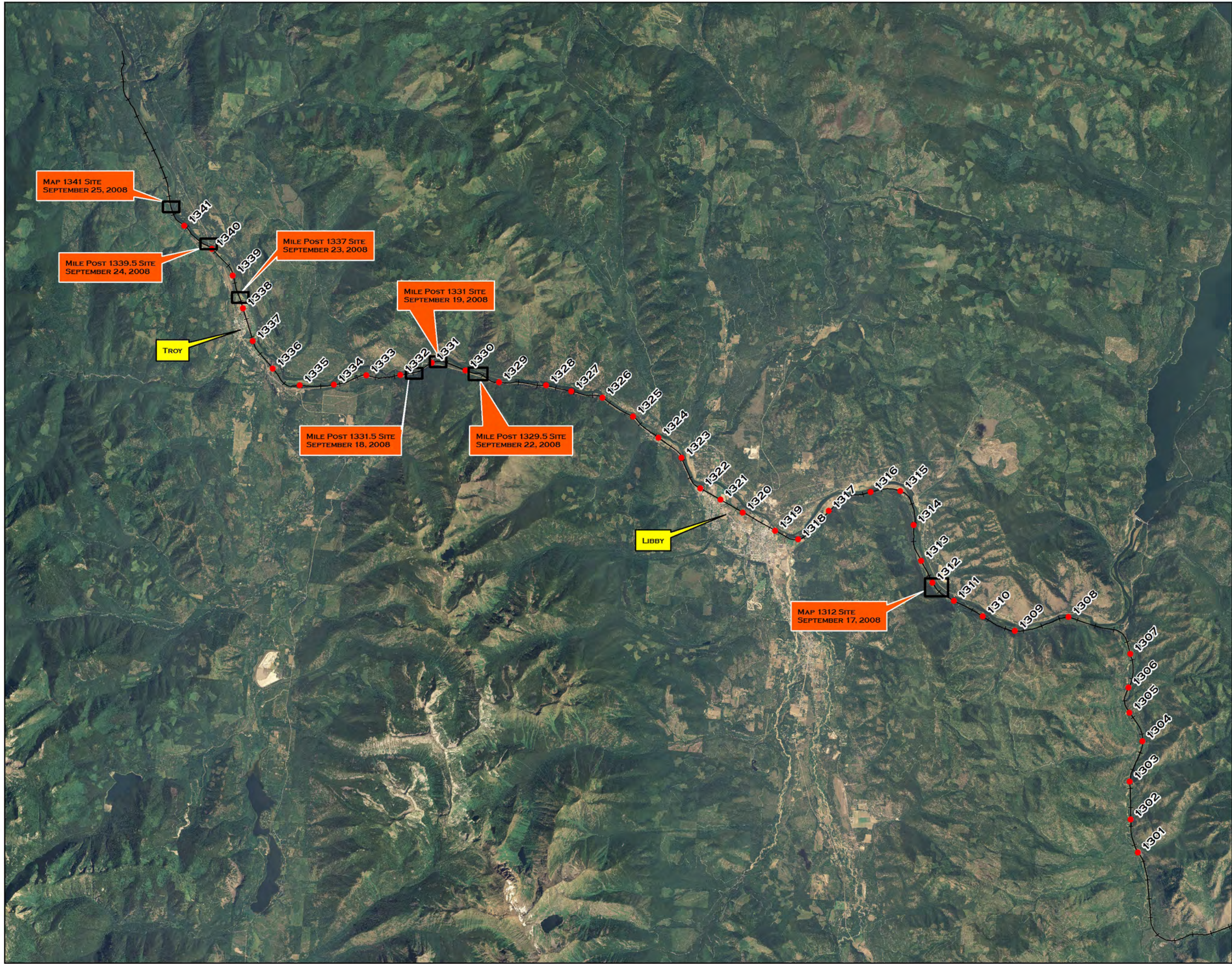


Figure 3  
Sampling Index Map

Activity Based Sampling  
Summary Report  
--  
*Worker Receptors*

BNSF Kootenai River Sub  
Libby, Montana

**Legend**

- Approximate Milepost Locations
- BNSF Railway

0 7,000 14,000 28,000

Scale In Feet

0 2 4

Scale In Miles

Project Number: 5539-140  
Date: March 8, 2010  
Drafted By: KLA  
Reviewed By: SJC  
Reference: 2006 Lincoln Aerial



11 E. Superior St. Suite #260  
Duluth, MN 55802  
Phone: 218.625.2332  
Fax: 218.625.2337





# APPENDIX A

## ANALYTICAL SUMMARIES

**SAP ANALYTICAL SUMMARY # OU6RR1008**  
**SUMMARY OF PREPARATION AND ANALYTICAL REQUIREMENTS FOR ASBESTOS**

**SAP Title:** Rail Maintenance Worker Activity-Based Sampling and Analysis Plan

**SAP Date (Revision):** TBD

**EPA Technical Advisor:** Rebecca Thomas

(contact to advise on DQOs of SAP related to preparation/analytical requirements)

**Sampling Program Overview:** This document is the Rail Maintenance Worker Activity-Based Sampling and Analysis Plan (SAP) for the collection and analysis of samples of outdoor air in the immediate vicinity of rail maintenance activities that may actively disturb outdoor soil on portions of BNSF Railway Company (BNSF) Right-of-Way (ROW), which is located within Operable Unit (OU) six of the Libby, Montana, Superfund Site. This SAP addresses worker receptors that may be exposed to asbestos in air as a result of BNSF rail maintenance activities. Potential exposures will be evaluated through the collection of personal air samples (to provide valuable information for scoping the RI/FS Work Plan for OU6). A total of 14 personal air samples will be collected.

**Index ID Prefix:** BA = Air

**Medium-Specific TEM/PCM Preparation and Analytical Requirements for Field Samples:**

Medium Code	Medium, Sample Type	Preparation Details				Analysis Details			Applicable Laboratory Modifications (c)
		Investigative? (a)	Indirect Prep? (a,b)		Filter Archive? (b)	Method(s)	Recording Rules	Analytical Sensitivity/ Stopping Rules	
			With Ashing (b)	Without Ashing (b)					
A	Outdoor ABS Worker Air Samples	Yes	Yes Based on Analyst's Judgement	No	Yes	TEM ISO 10312	All Asbestos structures counted; L: $\geq 0.5\mu\text{m}$ AR: $\geq 3:1$	Count until 1 is achieved: i) Target S = 0.0001 cc-1(d), ii) 50 LA found, or iii) $0.5\text{ mm}^2$ of filter is evaluated	LB-000016, LB-000016a, LB-000019, LB-000028, LB-000029, LB-000029a, LB-000029b, LB-000030, LB-0000031, LB-000031a, LB-000045, LB-000053, LB-000066, LB-000084, LB-000085

(a) See LB-000053 for additional details

(b) See most current version of EPA-LIBBY-08 for preparation details

(c) Use most recent versions of listed modifications

(d) Target sensitivity is set at 0.0001 cc-1; however, according to the Field Change Order (FCO) #17-1 (attached), sensitivity was adjusted to 0.0024 cc-1.

**TEM/PCM Preparation and Analytical Requirements for Quality Control Samples:**

Medium Code	Medium, Sample Type	Preparation Details			Analysis Details			Applicable Laboratory Modifications (c)
		Indirect Prep?		Filter Archive? (b)	Method(s)	Recording Rules	Stopping Rules	
		With Ashing (b)	Without Ashing (b)					
B	Field Blank	No	No	Yes	TEM ISO 10312	All Asbestos structures counted; L: $\geq 0.5\mu\text{m}$ AR: $\geq 3:1$	Count until 0.1 mm <sup>2</sup> of filter is evaluated	LB-000016, LB-000016a, LB-000019, LB-000028, LB-000029, LB-000029a, LB-000029b, LB-000030, LB-0000031, LB-000031a, LB-000045, LB-000053, LB-000066, LB-000084, LB-000085
C	Lot Blank	No	No	Yes	TEM ISO 10312	All Asbestos structures counted; L: $\geq 0.5\mu\text{m}$ AR: $\geq 3:1$	Count until 0.1 mm <sup>2</sup> of filter is evaluated	LB-000016, LB-000016a, LB-000019, LB-000028, LB-000029, LB-000029a, LB-000029b, LB-000030, LB-0000031, LB-000031a, LB-000045, LB-000053, LB-000066, LB-000084, LB-000085

(d) Target sensitivity is set at 0.0001 cc-1; however, according to the Field Change Order (FCO) #17-1 (attached), sensitivity was adjusted to 0.0024 cc-1.

**PLM Preparation and Analytical Requirements:**

Medium Code	Medium, Sample Type	Preparation Method	Analysis Method	Applicable Laboratory Modifications

**Laboratory Quality Control Frequencies:**

**TEM:** Lab Blank – 4%  
 Recount Same – 1%  
 Recount Different – 2.5%  
 Verified Analysis – 1%  
 Repreparation – 1%  
 Interlab – 0.5%

**PLM:** Lab Duplicate – \_\_\_\_%  
 Interlab – \_\_\_\_%

**Requirements Revision:**

Revision #:	Effective Date:	Revision Description

-----  
Analytical Laboratory Review Sign-off:

☐ Batta [sign & date: \_\_\_\_\_]  
☐ EMSL-Libby [sign & date: \_\_\_\_\_]  
☐ EMSL – Westmont [sign & date: \_\_\_\_\_]  
☐ EMSL – Beltsville [sign & date: \_\_\_\_\_]

☐ ESAT [sign & date: \_\_\_\_\_]  
☐ Hygeia [sign & date: \_\_\_\_\_]  
☐ MAS [sign & date: \_\_\_\_\_]  
☐ RESI [sign & date: \_\_\_\_\_]

*[Checking the box and initialing above indicates that the laboratory has reviewed and acknowledged the preparation and analytical requirements associated with the specified SAP.]*



## APPENDIX B

### FIELD NOTES

LIBBY, MT & TROY, MT  
BNSF RAIL MAINTENANCE  
ACTIVITY BASED SAMPLING (ABS)  
FIELD BOOK #1

START DATE

09-17-08



*"Rite in the Rain"*

ALL-WEATHER  
ENVIRONMENTAL

No. 550



6 Location MP 1312 Hi side LEFT Date 9-17-08  
Project / Client BNSF

0545 EMR ARRIVED ON SITE FOR  
SAFETY MEETING.  
0550 BNSF REP MET WITH SCOTT  
CARNEY & DAVID WELCH TO  
DISCUSS HOW TO HANG PUMPS  
ON WORKERS. ALSO MET WITH  
LAURA FROM ENSR AND NICOLE  
WITH CDM AT THIS TIME.

0608 BNSF SAFETY MEETING.  
TRACK TRAVELING FROM HARBOR TO  
RIPLEY, WAS EXPLAINED.  
GOOP SUITS & BOOTIES ARE PPE  
FOR BNSF EMPLOYEES.

EMPLOYEES WITH PERSONAL PUMPS:

0630 ABS \* VICTOR BACHMEIER 2767 BA-00002 004868  
0630 ABS \* ERIC PAULACK 0145 BA-00001 004867  
\* VICTOR IS CRIB OPERATOR STOP TIME 1436  
\* ERIC IS LABORER 1432

BOTH PUMPS START TIME  
0636

0621 SAFETY MEETING ENDS. BNSF EMPLOYEES  
OUTFIT INTO LEVEL D PPE WITH SUITS.

7 Location MP 1312 Hi side LEFT Date 9-17-08  
Project / Client BNSF

### OSHA SAMPLES

A JOSH SYNNOTT 8473 GROUND CREW  
~~OSHA SAMPLES~~ 09-17-08  
B BRYCE VANDENBERG 6225 SCRUB CANE OP.  
C RODNEY ZIMMERMANN 3662 TAMPER OP.  
D KAGEN COX 9430 LABORER  
E RYAN TUCKER 3932 LABORER  
F MIKE COSSART 8354 SPIKER

### PUMP NUMBERS

		PUMP START
C	RODNEY ZIMMERMAN #3	0637
D	KAGEN COX #4	0639
A	JOSH SYNNOTT #5	0641
E	RYAN TUCKER #6	0642
B	BRYCE VANDENBERG #7	0644
F	MIKE COSSART #8	0645

- BNSF REP BRETT PETERSON FOREMAN  
0654 LEFT SAFETY MEETING AREA FOR  
RIPLEY.

0704 ARRIVED AT RIPLEY

### TEAM MEMBERS: TASKS

SCOTT CARNEY (EMR) AIR / WEATHER MONITOR  
DAVE WELCH (EMR) SOIL / AIR SAMPLING  
JOHN STARR (EMR) AIR MONITORING

Location B MP 1312 Date 09-17-08  
 Project / Client BNSF

# TEAM MEMBERS CONT

AMANDA THORNTON (EMR) <sup>WEATHER STATION / FIELD BOOK</sup> SOIL SAMP.  
 MATT LENZ (EMR) AIR SAMP. / GPS / VIDEO  
 LAURA TROZZOLO  
 NICOLE (CDM)  
 BEIN

0710 EMR SAFETY MEETING

- TRACK PROTECTION MAIN IS NOON  
SIDING IS 1130
- HOSPITAL IS IN LIBBY ON  
3RD & LOUISIANA.

0720 SAFETY MEETING ENDS BEGIN  
EQUIPMENT SET UP.

0737 BNSF ARRIVES ON SITE

0743 BRETT PETERSON GAVE US INFO AS FOLLOWS:  
 MAIN 3046-6 WBS WSS  
 RIVERVIEW TO WESS RIPLEY  
 SIDING 246-7 ESS RIPLEY TO  
 WSS RIPLEY

BOTH TRACKS <sup>UNTIL</sup> PACIFIC 1130

0811 DAVE WELCH STARTED SETTING UP  
 SOIL SAMPLING PLOTS  
 GENERATORS UP & RUNNING  
 WEATHER STATION UP & RUNNING

Location MP 1312 Date 09-17-08  
 Project / Client BNSF

# CURRENT WEATHER CONDITIONS:

TEMP 38°F, CLEAR SKIES WITH  
 VERY MINIMAL CLOUDS

0847 DAVE WELCH & AMANDA  
 THORNTON DON TYVEK SUITS, BOOTIES,  
 & PERSONAL PUMPS TO BEGIN  
 TRESSPASSING ACTIVITIES

<sup>START</sup> 0749 AMANDA 4441 BA-00003 SHEET 004869  
 0749 DAVE 9586 BA-0004 SHEET 004870

0930 SCOTT CARNEY LEFT TO REPLACE  
 ONE OF THE GENERATORS. IT STOPPED  
 WORKING.

1001 BNSF GANG PASS MP 1312  
 HEADING WEST

1021 SCOTT CARNEY ARRIVED BACK  
 FROM GETTING A NEW WORKING  
 GENERATOR

1037 SAMPLING OF SOIL BEGINS

SAMPLE 1

RR- 00001

SP- 138460

> SHEET #  
 005922

Location BT MP 1312Date 09-17-08Project / Client BNSF

DAVE WELCH COLLECTS 3 FINGERS  
HIGH FULL OF SOIL IN A ONE GALLON  
ZIPLOC<sup>®</sup> BAG FOR SAMPLING ANALYSIS.  
1044 MATT LENZ TAKES GPS  
LOCATION OF SAMPLE POINT (SP) 1

1048 **RR- 00002** SOIL SAMPLE  
#2 IS TAKEN  
**SP- 138461** SHEET #005922

1048 MATT LENZ TAKES GPS LOCATION  
OF SP 2

1049 LOW AMOUNT OF VERMICULITE (VISUAL)  
FOUND IN SOIL

1057 **RR- 00003** SOIL SAMPLE #3  
IS TAKEN  
**SP- 138462** SHEET #005922

1057 LOW AMOUNT OF ~~TA~~ VISUAL VERMICULITE  
MOSTLY DISSEMINATED

1057 MATT LENZ TAKES GPS LOCATION  
OF SP #3

Location MP 1312Date 09-17-08Project / Client BNSF

1105 **RR- 00004** SOIL SAMPLE  
#4 IS TAKEN  
**SP- 138463** SHEET #005923

1105 LOW AMOUNT OF ~~VET~~ VISUAL VERMICULITE  
FOUND IN SOIL (MOSTLY DISSEMINATED)

1105 MATT LENZ TAKES GPS LOCATION  
OF SP #4

1113 **RR- 00005** SOIL SAMPLE #5  
IS TAKEN  
**SP- 138464** SHEET #005923

1113 LOW AMOUNT OF VERMICULITE (VISUAL)  
FOUND IN SOIL (MOSTLY DISSEMINATED)  
PLOT OF COAL IN THE VICINITY

1113 MATT LENZ TAKES GPS LOCATION  
OF SP #5

1122 **RR- 00006** SOIL SAMPLE #6  
IS TAKEN  
**SP- 138465** SHEET #005923

1122 NO VERMICULITE FOUND IN SOIL  
VISUAL

1122 MATT LENZ TAKES GPS LOCATION OF SP #6

Location MR 1312Date 09-17-08Project / Client BNSF

1129 **RR- 00007** SOIL SAMPLE #7  
IS TAKEN  
SHEET #005924

**SP- 138466**

1129 NO VISUAL VERMICULITE PRESENT  
1129 MATT LENZ TAKES GPS LOCATION  
OF SP#7

1138 **RR- 00008** SOIL SAMPLE #8  
IS TAKEN  
SHEET # 005924

**SP- 138467**

1138 NO VISUAL VERMICULITE FOUND  
1138 MATT LENZ TAKES GPS LOCATION  
OF SP#8

1147 **RR- 00009** SOIL SAMPLE #9  
IS TAKEN  
SHEET # 005924

**SP- 138468**

1147 LOW AMOUNT OF VISUAL VERMICULITE  
ENCOUNTERED  
1147 MATT LENZ TAKES GPS LOCATION OF  
SP#9

Location MP 1312Date 09-17-08Project / Client BNSF

1156 **RR- 00010** SOIL SAMPLE  
#10 IS TAKEN  
SHEET #005925

**SP- 138469**

1156 LOW AMOUNT OF VISUAL VERMICULITE  
ENCOUNTERED  
1156 MATT LENZ TAKES GPS LOCATION  
OF SP #10

1204 **RR- 00011** SOIL SAMPLE  
# 11 IS TAKEN  
SHEET #005925

**SP- 138470**

1204 LOW AMOUNT OF VISUAL  
VERMICULITE ENCOUNTERED  
1204 MATT LENZ TAKES GPS LOCATION  
OF SP# 11

1214 **RR- 00012** SOIL SAMPLE #12  
IS TAKEN  
SHEET #005925

**SP- 138471**

1214 LOW AMOUNT OF VISUAL VERMICULITE  
ENCOUNTERED  
1214 MATT LENZ TAKES A GPS LOCATION  
OF SP #12

14

Location

MP 1312

Date

09-17-08

Project / Client

BNSF

\* OUT OF SEQUENCE

1233

RR- 00013

SOIL SAMPLE #13

IS TAKEN

SHEET # 005926

SP- 138472

1233

NO VISUAL VERMICULITE ENCOUNTERED

1233

MATT LENZ TOOK GPS LOCATIONS

OF SP#S 13, 14, &amp; 15.

1254

RR- 00014

SOIL SAMPLE #14

IS TAKEN

SHEET # 005926

SP- 138473

\*1245

TRAIN #  
7407

BNSF TRAIN PASSES BY. ALL

PERSONNEL CLEAR OF TRACKS EAST BOUND

1256

TRAIN #  
5482

ANOTHER EAST BOUND

TRAIN PASSES BY. ALL PERSONNEL

CLEAR OF TRACKS.

1306

COMMENCED SOIL SAMPLING.

1306

LOW AMOUNT OF VISUAL

VERMICULITE ENCOUNTERED

1316

RR- 00015

SOIL SAMPLE #15

IS TAKEN

SHEET # 005926

SP- 138474

Location

MP 1312

Date

09-17-08

Project / Client

BNSF

15

1316 NO VISUAL VERMICULITE PRESENT

1317 SOIL SAMPELING FOR TODAY

IS COMPLETE

1331 FLOW RATE OF PERSONAL PUMPS

AMANDA THORNTON 2.4 L/min

DAVE WELCH 2.8 L/min

NO FURTHER ENTRIES

AMANDA THORNTON 09-17-08



10 Location KOOTENAI SUBDIVISION Date 09-18-08  
Project / Client BNSE

0600 ARRIVED ONSITE FOR BNSE SAFETY MEETING

0602 COUGAR CROSSED TRACKS IN FRONT OF US!

0610 BNSE GANG GATHERED FOR SAFETY MEETING

0611 - ONLY MAIN LINE TODAY 0730-1500 PK. TIME  
- 2900'  
- Tying UP AT KOOTENAI FALLS TODAY  
- PPE FOR BNSE GANG IS GLOVES SUITS AND BOOTS

0630 BNSE GANG STRETCHES BEFORE WORK

PUMP STATION	SN#	SAMPLE #
0642 RYAN TUCKER	3932	LABORER 11
0644 JOSH SYNNOTT	8473	LABORER 12
0646 BRYCE VANDENBERG	6224	MACHINE 13
0648 MIKE COSSART	8354	OPERATOR 14
0650 KAGEN COX	9436	LABORER 15
0652 RODNEY ZIMMERMAN	3462	TAMPER 16

0655 BMR LEFT FOR KOOTENAI FALLS

0720 EMR ARRIVED ONSITE AT KOOTENAI FALLS (MP 1330.61331.9)

0924 EMR WAITED FOR BNSE CREW TO ARRIVE AT MP 1331.5. SAFETY TAILGATE MEETING HELD NOW.

17 Location MP 1331.5 Date 09-18-08  
Project / Client BNSE

0932 - N. SIDE SIDING TRACK PROTECTION. TRAINS WILL BE COMING THROUGH. EVERY MACHINE WILL KNOW WHEN TRAINS ARE COMING

- SOIL ONLY ON NORTH SIDE FOR SAMPLING.

- NOTIFY BNSE PERSONNEL IN CASE OF EMERGENCY. HWY 2 INTO LIBBY FOR NON-CRITICAL EMERGENCY.

- DOUBLE READ (QC) PAPERWORK & INITIAL BEFORE HANDING IN TO CDM

- SOIL SAMPLE AD#'s AD 005568 ON EVERY SHEET.

0941 - SAFETY MEETING ENDED.

0948 - EMR ARRIVES AT JOB ACTIVITY SITE

1004 - AMANDA THORNTON & DAVE WELCH DON TYVEK SUITS & PERSONAL PUMPS

1006 - DAVE WELCH & AMANDA THORNTON TURN PERSONAL PUMP ON TO BEGIN TRESPASSING ACTIVITIES.

Location MP 1331.5 Date 09-18-08Project / Client BNSF\* OUT OF SEQUENCE

1010	MATT LENZ DONS AND ACTIVATES PERSONAL PUMP. ALL PUMPS SET TO 2.8 L/MIN.
1024	WEATHER STATION UP & RUNNING CURRENT WEATHER 54.9°F CLEAR BLUE SKIES WIND SPEED VARIES 0.6-2.4 MPH. SUNNY.
1026	MAKE SURE & CHECK WEATHER STATION EVERY HOUR
* 1004	DAVE WELCH MARKS SOIL SAMPLE # LOCATIONS
1107	RR- 00016 SOIL SAMPLE #16 IS TAKEN SP- 138475 SHEET #005927
1107	NO VISUAL VERMICULITE SEEN.
1110	LABELS KEEP FALLING OFF OF SAMPLE BAGS.
1115	RR- 00017 SOIL SAMPLE #17 IS TAKEN SP- 138476 SHEET #005927
1115	NO VISUAL VERMICULITE (VV) SEEN

Location MP 1331.5 Date 09-18-08 19Project / Client BNSF

1118	RR- 00018 SOIL SAMPLE #18 IS TAKEN SP- 138477 SHEET #005927
1120	ACTUAL TRESSPASSETTS ON SITE OLD MAN & LADY FISHING W/ <del>RR</del> 09-18-08 2 SCHNOWSERS.
1120	NO VV SEEN.
1142	RR- 00019 SOIL SAMPLE #19 IS TAKEN SP- 138478 SHEET #006101
1142	NO VV ENCOUNTERED
NOTE: 18 MIN TIME SPAN BETWEEN SAMPLES 18 & 19 WERE DUE TO HAVING TO RETRIEVE FIELD SUPPLIES FROM TRUCK & SPEAKING WITH TRESSPASERS.	
1152	RR- 00020 SOIL SAMPLE #20 IS TAKEN SP- 138479 SHEET #006101
1152	LOW AMOUNT OF VV SEEN. DISSEMINATED VV.

Location MP 1331.5 Date 09-18-08Project / Client BNSF

1200

RR- 00021

SOIL SAMPLE #21

IS TAKEN

SHEET # 006101

SP- 138480

1200

LOW AMOUNT OF DISSEMINATED  
VV ENCOUNTERED.

1213

RR- 00022

SOIL  
SAMPLE # 22 IS

TAKEN

SHEET # 006102

SP- 138481

1213

LOW AMOUNT OF VV ENCOUNTERED

1227

RR- 00023

SOIL SAMPLE #23 IS

TAKEN

SHEET # 006102

SP- 138482

1227

LOW AMOUNT OF DISSEMINATED  
VV ENCOUNTERED

NOTE

SAMPLE #24 WILL NOT BE USED  
AND WAS NOT COLLECTED. WE  
WILL RESUME AT #25. THIS WAS  
MY MISTAKE BY PRELABELING  
THE FORMS.

1312

GPS POINT TAKEN OF SAMPLE #23.

Location MP 1331.5Date 09-18-08 21Project / Client BNSF1313 GPS LOCATION TAKEN OF SOIL  
SAMPLE #221314 GPS LOCATION TAKEN OF SOIL  
SAMPLE #211315 GPS LOCATION TAKEN OF SOIL  
SAMPLE #201316 GPS LOCATION TAKEN OF SOIL  
SAMPLE #191316 GPS LOCATION TAKEN OF SOIL  
SAMPLE #181317 GPS LOCATION TAKEN OF SOIL  
SAMPLE #71318 GPS LOCATION TAKEN OF SOIL  
SAMPLE #13

NOTE ALL GPS LOCATION WERE  
TAKEN BY MATT LENZ OF EMR  
1350 BNSF TRAIN PASSED BY NORTH  
BOUND

1417 2 TRESPASSERS CROSS TRACKS  
TO GO FISHING FOR SALMON  
1600 EMR LEFT  
PREMISES

NO FURTHER ENTRIES  
#07 AMANDA THORNTON



Location MP 1330.5 1331 Date 09-19-08  
 Project / Client BNSF

Location MP 1330.5 1331 Date 09-19-08 23  
 Project / Client BNSF

0555 ALLEMP TEAM ARRIVE ON SITE  
 FOR BNSF SAFETY MEETING  
 0603 ROW 6.28.3  
 SAFETY MEETING 212 Injury FREE DAY  
 JOB KOOTENAI SIDING  
 GO 16  
 GO 20  
 SI 16  
 610 FEET LEFT TO COMPLETE  
 MAIN & SIDING TRACK PROTECTION  
 ALTERNATION BETWEEN THE TWO  
 TYING UP HERE FOR MONDAY  
 CONCRETE WORK NEXT WEEK  
 TYING WOOD UP AT TROY BY  
 WED. OR THURS. NEXT WEEK  
 GOOP SUITS & BOOTIES FOR BNSF  
 EMPLOYEES PPE.  
 - 406672 9146 CHAD  
 GOHMAN TUES WOOD JOB

START TIME	SSN #	SAMPLE #
0631	RODNEY ZIMMERMAN 3662	TAMPER #19
0641	KAGEN COX 9480	LABORER #24
0633	JOSH SYNNOT 8473	MACHINE OPERATOR #20
0639	BRYCE VANDENBERG 6225	" #23
0637	MIKE COSSAIRT 8354	" #22

START TIME	SSN #	SAMPLE #
0635	RYAN TUCKER 3932	LABORER #21
0648	DAVE WELCH #4091	TURN PUMPS ON
	AMANDA THORNTON 4095	
	MATT LENZ 4099	
0707	CURRENT WEATHER CONDITIONS	
	50.2°F	
	WIND SPEED 0.6 MPH	
	CLEAR DAY WITH NO CLOUDS	
	NO RAIN FORECASTED.	
0707	WEATHER STATION UP & RUNNING	

SAMPLE #'S FOR EMR EMPLOYEES  
 AMANDA THORNTON #BA-00024  
 MATT LENZ #BA-00025  
 DAVID WELCH #BA-00023

0754 RR- 00025  
 SP- 138484  
 0754 NO VV SEEN

0804 RR- 00026  
 SP- 138485

SOIL SAMPLE #25  
 IS TAKEN  
 SHEET #006103  
 SOIL SAMPLE #26  
 IS TAKEN  
 SHEET #006103

Location MP 1330.5 1331 Date 09-19-08Project / Client BNSF

0804	NO VV SEEN IN SAMPLE #26
0813	RR- 00027
	SOIL SAMPLE #27 IS TAKEN
	SHEET #006103
	SP- 138486
0813	NO VV ENCOUNTERED
0821	RR- 00028
	SOIL SAMPLE #28 IS TAKEN
	SHEET #006104
	SP- 138487
0821	NO VV ENCOUNTERED
0832	RR- 00029
	SOIL SAMPLE #29 IS TAKEN
	SHEET #006104
	SP- 138488
0832	NO VV ENCOUNTERED
0842	RR- 00030
	SOIL SAMPLE #30 IS TAKEN
	SHEET #006104
	SP- 138489
0842	NO VV ENCOUNTERED
<b>NOTE</b>	ROADMASTER TODAY IS BOCKY LASORTE.
0935	SOIL SAMPLE 00025 GPS LOCATION TAKEN

Location MP 1330.5 1331 Date 09-19-08Project / Client BNSF

0936	GPS TAKEN OF SAMPLE #26
0937	GPS TAKEN OF SAMPLE #27
0938	GPS TAKEN OF SAMPLE #28
0940	GPS TAKEN OF SAMPLE #29
0941	GPS TAKEN OF SAMPLE #30
1218	EMR BREASS DOWN EQUIPMENT
1240	EMR LEAVES WORK SITE (ESTIMATED TIME)

NO FURTHER EXPLORATION  
AMANDA THORNTON  
9.19.08

Location 1331 MP TIE-UP

Date 9-22-08

Project / Client BNSF

0535 DAVE WELCH & AMANDA THORNTON ARRIVE ON SITE (EMPLOYEES).

- WEATHER 50°F & RAINING. ALSO RAINED LAST NIGHT.

9:00 AM  
0600 ESS KOOTENAI FALLS & WSS KOOTENAI FALLS.

610' FRIDAY

1120' & 1400' TODAY

1120' WOOD 10' CV <sup>ACT 9-22-08</sup> 1327

1400' CV <sup>ACT 9-22-08</sup> 1329A

1200 TIME TRAIL PROTECTION

0600 BNSF SAFETY MEETING

MAIN LINE IS LIVE AMTRAK WEST - BOUND.

[NOTE] ALL PUMPS SET TO 28 L/MIN.

START TIME	NAME	SSN	JOB	SAMPLE #
0621	RYAN TUCKER	3932	LABORER	27
0624	MARLECKSTROM	4489	LABORER	28
0626	COLBY CHRISTIE	7073	LABORER	29
0629	JOSH SYNNOT	8473	LABORER	30
0633	BRYCE VANDENBERG	1325	MACHINE OPER.	31
0636	MIKE COSSAIRT	8354	MACHINE OPER.	32

0715 EMR & BNSF LEAVE FOR WORK AREA  
BNSF WILL MEET EMR AT MP 1329.8

Location MP 1329.8

Date 09-22-08 27

Project / Client BNSF

0939 WEATHER STATION UP & RUNNING  
TEMP 54°F

WIND SPEED VARIABLE BETWEEN  
7.8 MPH & 6.0 MPH

0941 BA-00031 MATT LENZ

0946 BA-00032 AMANDA THORNTON

0947 DAVE WELCH & JOHN STARR  
ARE IN THE PROCESS OF SETTING  
UP PERIMETER

1009 DAVE WELCH LEFT TO MAKE A  
PHONE TO CLARIFY BNSF  
DIRECTIONS.

1021 DAVE WELCH RETURNS TO MP 1329  
[NOTE] ROADMASTER WAS NOT CLEAR  
ON HIS WHITEBOARD OR VERBALLY  
WHERE THEIR WORK ZONE WOULD  
BE TODAY.

1025 EMR BROKE DOWN EQUIPMENT &  
WENT TO MP 1329.8

1040 EMR ARRIVED AT MP 1329.8

1043 WEATHER STATION UP & RUNNING

1046 PERIMETER PUMPS BEING SETUP

1100 SOIL SAMPLE PLOTS SET UP

THIS 107  
9-22-08

Location MP 1329.8Date 9-22-08Project / Client BNSF

1115	RR- 00031	SOIL SAMPLE #31 IS TAKEN SHEET # 006105
1115	SP- 138490	
1115	NO VV SEEN	
1122	RR- 00032	SOIL SAMPLE #32 IS TAKEN SHEET # 006105
	SP- 138491	
1122	NO VV SEEN	
1123	BEGIN TO RAIN AGAIN	
1128	RR- 00033	SOIL SAMPLE #33 IS TAKEN SHEET # 006105
	SP- 138492	
1128	NO VV SEEN	
<u>NOTE</u>	ALL SOIL SAMPLED TODAY IS COARSE SILTY-SAND WITH TOPSOIL & BALLAST INTERMIXED	
1133	RR- 00034	SOIL SAMPLE #34 IS TAKEN SHEET # 006106
	SP- 138493	
1133	NO VV SEEN	

Location MP 1329.8Date 9-22-08Project / Client BNSF

1133	SOIL IS VERY WET	
1143	RR- 00035	SOIL SAMPLE #35 IS TAKEN SHEET # 006106
	SP- 138494	
1143	NO VV SEEN	
1155	RR- 00036	SOIL SAMPLE #36 IS TAKEN SHEET # 006106
	SP- 138495	
1150	LOW AMOUNT OF DISSEMINATED VV SEEN	
1200	RR- 00037	SOIL SAMPLE #37 IS TAKEN SHEET # 006107
	SP- 138496	
1200	NO VV SEEN	
<u>NOTE</u>	LACK OF VV COULD BE DUE TO SOIL MOISTURE CONTENT BEING VERY HIGH.	
1208	RR- 00038	SOIL SAMPLE #38 IS TAKEN SHEET # 006107
	SP- 138497	

Location MP 1329.8

Date 9-22-08

Project / Client BNSF

## \* OUT OF SEQUENCE

1209 THE SOIL SAMPLE #38 IS THE ONLY DRY SAMPLE TAKEN BUT WITH THE SAME COMPONENTS MENTIONED EARLIER

1209 NO VU SEEN

1210 SOIL SAMPLE ACTIVITY CONCLUDES

1227 GPS IS TAKEN OF SOIL SAMPLE PLOT #31

1229 GPS IS TAKEN OF SOIL SAMPLE PLOT #32

1230 GPS IS TAKEN OF SOIL SAMPLE PLOT #33

1231 GPS IS TAKEN OF SOIL SAMPLE PLOT #34

1232 GPS IS TAKEN OF SOIL SAMPLE PLOT #35

1234 GPS IS TAKEN OF SOIL SAMPLE PLOT #36

1235 GPS IS TAKEN OF SOIL SAMPLE PLOT #37

1236 GPS IS TAKEN OF SOIL SAMPLE PLOT #38

NOTE ALL GPS LOCATIONS WERE TAKEN BY MATT LENZ OF EMR

1237 GPS IS TAKEN OF WEATHER STATION  
GPS IS TAKEN OF STATIONARY PUMP #1401  
#BA-00034

1239 GPS IS TAKEN OF STATIONARY PUMP #836A  
BA-00035

\*1030 GENERATORS FOR STATIONARY PUMPS SWITCHED OUT.

NO FURTHER ENTRIES  
AMANDA THORNTON

Location MP 1337. B TROY RAIL YARD Date 9-23-08

Project / Client BNSF

0540 DAEWELCH & AMANDA THORNTON  
PROMEMO ARRIVE ON SITE

0545 DAEWELCH & JOHN STARR  
TALK WITH ROADMASTER CHAD  
DOUGHERTY DOUGHMAN

0600 BNSF SAFETY MEETING COMMENCES  
REGAGE CURVE MP 1337. B  
1100 FT HIGH SIDE RIGHT HAND RAIL

START TIME	NAME	SSN	JOB	SAMPLE #
0628	KARL HARMS	1954	ANCHOR BOX OPER.	40
0631	JODY CROWE	5426	PLATE BLOCKER OPER	35
0632	BEN ROBERTSON	5372	LABORER	36
0635	CLINT EGAN	3009	MACHINING OPER	37
0636	CJ CAVEN	1405	SPICA PULLER	38
0638	JUSTIN GARRETT	1267	DRY LAGER	39
0640	MATT STASHICK	7132	LABORER	40
	STEWART STEWART	9955	LABORER	41
0631	DALE JOHNSON	5315	CRIBBER OPER	
0640	ALL PUMPS HUNG & STARTED.			
0710	TRESPASSER PUMP (AMANDA THORNTON) STARTED			
0720	WEATHER STATION UP & RUNNING TEMP 45.4°F - FOGGY WIND SPEED 0.6 MPH			



Location MP 1337 B TROY RAIL YARD Date 09-23-08Project / Client BNSF

0730 PERIMETER PUMPS STARTED

0819 TEMP 38°F

0831

**RR- 00039**

SOIL SAMPLE #39

IS TAKEN

SHEET # 006108

**SP- 138498**

0831 LOW VV SEEN

TEXTURE: SANDY SOIL WITH LOTS OF  
WOOD & OIL & COARSE GRAVEL

0838

**RR- 00040**

SOIL SAMPLE #40

IS TAKEN

SHEET # 006108

**SP- 138499**

TEXTURE: SAME AS ABOVE

HARD TO SEE ANY VV WITH THIS SOIL

BEING SO SATURATED

0838

NO VV SEEN

0848

**RR- 00041**

SOIL SAMPLE #41

IS TAKEN

SHEET # 006108

**SP- 138500**

TEXTURE: SAME AS ABOVE

0848 LOW VV SEEN

Location MP 1337 B TROY RAIL YARD Date 09-23-08Project / Client BNSF**\* OUT OF SEQUENCE DUE TO MACHINE THROWING  
ROCKS**

0856

**RR- 00042**

SOIL SAMPLE #42

IS TAKEN

**SP- 138501**

SHEET # 006109

0856

LOW AMOUNT OF VV SEEN

TEXTURE: SAME AS BEFORE

\* 0924

**RR- 00043**

SOIL SAMPLE #43

IS TAKEN

SHEET # 006109

**SP- 138502****[NOTE]**RAIL WORKERS ARE NOT WEARING  
RESPIRATORS NOR WERE THEY TOLD  
TO DO SO

0913

**RR- 00044**

SOIL SAMPLE #44

IS TAKEN

SHEET # 006109

**SP- 138503**

0913

LOW VV SEEN

TEXTURE: SAME AS BEFORE

0924

RR- 00043

SP- 138502

LOW VV SEEN

Project / Client BNSF

0936

**RR- 00045**

SOIL SAMPLE #45

IS TAKEN

SHEET # 006110

**SP- 138504**

TEXTURE IS SAME AS BEFORE

0936

LOW AMOUNT OF VV SEEN

0947

**RR- 00046**

SOIL SAMPLE # 46

IS TAKEN

SHUT #006110

**SP- 138505**

0947

~~LOW AMOUNT OF WASTE~~

MEDIUM AMOUNT OF VV SEEN

1008

GPS OF SOIL SAMPLE #39 TAKEN

WIO

GPS OF SOIL SAMPLE # 40 TAKEN

1012

GPS OF SOIL SAMPLE #41 TAKEN

-1015

GPS OF SOIL SAMPLE #42 TAKEN

1017

GPS OF SOIL SAMPLE #43 TAKEN

1019

GPS OF SOIL SAMPLE #44 TAKEN

1021

GPS OF SOIL SAMPLES TAKEN

1025

GPS OF SOIL SAMPLE # 46 TAKEN

NOTE

NOW THAT THE SUN IS OUT & FOG HAS  
CLEARED WE SEE EVERYWHERE!

1022

GENERATOR FOR STATIONARY PUMPS  
ON SOUTH TRACKS WENT DEAD.

SAMPLES NOT SUBMITTED.
------------------------

Project / Client BNSF

NOTE OF MAJOR CONCERN ROADMASTER OF  
RP-21 WAS TOLD BY DAVE WELCH OF EMR  
THAT IT WOULD BE ADVISEABLE TO HAVE  
HIS WORKERS WEAR RESPIRATORS, BASED  
ON THE SITE HISTORY OF THE TROY  
RAIL YARD. HIS WORKERS WERE NOT  
EVEN INFORMED THAT THERE WAS  
A THREAT. THE WORKERS AT LEAST  
DESERVE THE INFORMATION TO MAKE A  
PERSONAL CHOICE ON WHETHER OR NOT TO  
DON A RESPIRATOR.

400 ENR LEFT FOR CDM

NO FURTHER ENTRIES  
STANDARD THERMISTOR  
BY 23-88

Location TROY YARD TIEUP Date 09-24-08Project / Client BNSF

0550 EMPLOYEES ARE ALL ON SITE AND SETTING UP EQUIPMENT TO OUTFIT BNSF EMPLOYEES WITH PERSONAL PUMPS.

0600 BNSF SAFETY MEETING COMMENCES TODAY EMR WILL MEET RP-21 AT 2<sup>ND</sup> JOB SITE AT CV 1339 LOW SIDE LEFT RAIL MP 1339.5, 1300' TIE UP AT YAKT, MP 1343.5 ACCESS - HWY 2 (W), RIGHT ON HUNSMILL RD HOOK TO THE LEFT. ~2-5 WEST BOUND TRAINS TO WATCH

OSHA

FOR THIS MORNING.

START TIME

NAME

SSN

JOB

SAMPLE #

0622 DALE JOHNSON 5315 ASSISTANT FOREMAN 43

0624 JODY CROW 5426 DECLIPPER 44

0625 CJ CAVEN 1405 LABORER 45

0627 BEN ROBERTSON 5372 ASSISTANT FOREMAN 46

TODD HUT 2-11-08

0629 ARTHUR MCKEE 2451 OPERATOR 47

0631 DANIEL RODRIGUEZ 8874 OPERATOR 48

0659 EMR SAFETY MEETING  
SOIL SAMPLING ACTIVITIES REQUIRE  
LEVEL C PRE  
NO CRIBBER TODAY (CONCRETE).

Location MP 1339.5 Date 9-24-08Project / Client BNSF

0857 WEATHER STATION UP & RUNNING  
TEMP 47.3°F

WIND SPEED 0.6 MPH

FOGGY BUT THE SUN IS COMING THROUGH A LITTLE BIT.

0907 PERIMETER PUMPS UP AND RUNNING

NOTE DEFUNKED GENERATOR IS NOW WORKING AGAIN AFTER REPAIR AT RICKS RENTAL IN LIBBY, MT.

0920 DAVE WELCH PLOTS OUT SOIL SAMPLING LOCATIONS.

0953 SOIL SAMPLING BEGINS

0955

RR- 00047

SOIL SAMPLE #47

IS TAKEN

SHEET # 006111

SP- 138506

0955

NO VV SEEN

TEXTURE: CLAY/SILT/SAND WITH COARSE GRAVEL. HARD PACKED

1002

RR- 00048

SOIL SAMPLE #48

IS TAKEN

SHEET # 006111

SP- 138507

1002 TEXTURE: SILTY SAND W/COARSE GRAVEL



Location MP 1339.5Date 9-24-08Project / Client BNSF

1002 CS CAVEN (BNSF) WAS WEARING ONE OF OUR PERSONAL PUMPS. HE TOOK OFF THE PUMP & LEFT IT ON THE BACK OF A PIECE OF EQUIPMENT. ANOTHER BNSF EMPLOYEE FOUND THE PUMP & IS NOW WEARING IT. I WILL ADD HIS NAME WHEN I CAN GET IT. CS WAS WEARING SAMPLE #45.

1002 NO UV SEEN IN SOIL SAMPLE #48

1011

RR- 00049

SOIL SAMPLE #49

IS TAKEN

SHEET #006111

SP- 138508

TEXTURE: CLAY / SILT / SAND & A LITTLE BIT OF BALLAST

1011

NO UV SEEN

RR- 00050

SOIL SAMPLE #50

IS TAKEN

SHEET #006112

SP- 138509

TEXTURE: SAME AS ABOVE

1011

LOW AMOUNT OF UV SEEN

Location MP 1339.5Date 9-24-08Project / Client BNSF

1027

RR- 00051

SOIL SAMPLE #51

IS TAKEN

SHEET #006112

SP- 138510

TEXTURE: SAME AS ABOVE BUT OLDER / DARKER SOIL

1027 LOW UV SEEN

1037

RR- 00052

SOIL SAMPLE #52

IS TAKEN

SHEET #006112

SP- 138511

TEXTURE: SAME AS ABOVE

1037 LOW AMOUNT OF UV SEEN

1047

RR- 00053

SOIL SAMPLE #53

IS TAKEN

SHEET #006113

SP- 138512

TEXTURE: SAME AS ABOVE

1047 CAN SEE UV ON SURFACE OF SOIL LOW UV SEEN AT DEPTH

1102

RR- 00054

SOIL SAMPLE #54

IS TAKEN

SHEET #006113

SP- 138513

1102 SOIL SAMPLE #54 TEXTURE: SAME AS BEFORE

1102 VV IS SEEN ON SURFACE SOIL  
LOW VV SEEN AT DEPTH

1110 SOIL SAMPLE #55  
RR- 00055 IS TAKEN  
SHEET # 006114

SP- 138514

TEXTURE: SAME AS ABOVE

1110 VV IS SEEN ON SURFACE SOIL  
LOW VV SEEN AT DEPTH

1135 GPS OF SOIL SAMPLE #49 IS TAKEN

1137 GPS OF SOIL SAMPLE PLOT #50 IS TAKEN

1138 GPS OF SOIL SAMPLE PLOT #51 IS TAKEN

1139 GPS OF SOIL SAMPLE PLOT #52 IS TAKEN

1140 GPS OF SOIL SAMPLE PLOT #53 IS TAKEN

1143 GPS OF SOIL SAMPLE PLOT #54 IS TAKEN

1144 GPS OF SOIL SAMPLE PLOT #55 IS TAKEN

NOTE ALL GPS RECORDINGS WERE TAKEN BY  
MATT LENZ OF EMP.

1148 GPS OF STATIONARY PUMP TAKEN BA-00053

1149 GPS OF STATIONARY PUMP TAKEN BA-00052

1150 GPS OF STATIONARY PUMP TAKEN BA-00054

1151 GPS OF STATIONARY PUMP TAKEN BA-00055

NOTE THE NAME OF THE BNSF EMPLOYEE  
THAT DOWNED CJ'S PUMP (#45)  
WAS "SMILEY." THIS IS THE ONLY  
INFORMATION WE WERE ABLE TO  
GATHER.

1400 GML LEFT FOR CDM.

NO FURTHER ENTRIES  
AMANDA THORNTON  
9-24-08

tion TROY YARD TIE-UP RP-15 Date 9-25-08  
 act / Client BNSF

Location MP 1341 Date 9-25-08  
 Project / Client BNSF

EMR EMPLOYEES ALL ARRIVE AT  
 TROY YARD TIE-UP TO MEET RP-15  
 GANG  
 BNSF SAFETY MEETING COMMENCES  
 1341 LEFT HIRSA 600' THEN  
 RP-15 WILL BE OUT OF CUL.  
 BNSF SAFETY MEETING CONCLUDES  
 STRETCHING BEGINS.

# SAMPLES

NAME	SSN#	JOB # SSN# 9-25-08	SAMPLE #
JOSH SYNNOT	8473	LABORER	51
RYAN TUCKER	3932	LABORER	52
MIKE COSSART	8354	machine oper.	53
VICTOR BACHMIR	2767	machine oper.	54
RODNEY ZIMMERMAN	3662	LABORER	55
KAGEN COX	9430	LABORER	56

EMR ARRIVES AT MP 1341.  
 EMR SAFETY MEETING. LEVEL D PPE  
 6 HOUR TRAIL PROTECTION 0600-1000  
 WEATHER STATION UP & RUNNING.  
 TEMP 49.8°F  
 WIND SPEED 0.6 MPH  
 PERIMETER PUMPS UP & RUNNING.

0730 BNSF CREW BUS ARRIVES  
 0755 **RR- 00056** SOIL SAMPLE  
 #56 IS TAKEN  
**SP- 138515** SHEET #00615  
 0755 NO UV SEEN  
 TEXTURE: SANDY SILT WEATHERED  
 ROCK / BALLAST  
 0803 **RR- 00057** SOIL SAMPLE  
 #57 IS TAKEN  
**SP- 138516** SHEET #00615  
 TEXTURE: SAME AS ABOVE  
 0803 NO UV SEEN  
 0812 **RR- 00058** SOIL SAMPLE  
 #58 IS TAKEN  
**SP- 138517** SHEET #00615  
 TEXTURE: SAME AS ABOVE  
 0812 NO UV SEEN  
 0822 **RR- 00059** SOIL SAMPLE #59  
 IS TAKEN  
**SP- 138518** SHEET #00616

Location MP 1341Date 9-25-08Project / Client BNSF0822 ~~SO~~ <sup>ACT 9-25-08</sup> NO VU SEEN ON SAMPLE

#RR-00059

TEXTURE: SAME AS BEFORE

0833

RR- 00060

SOIL SAMPLE #60

IS TAKEN

SHEET #006116

SP- 138519

TEXTURE: SAME AS BEFORE

0833

NO VU SEEN

0844

RR- 00061

SOIL SAMPLE #61

IS TAKEN

SHEET #006116

SP- 138520

TEXTURE: SAND W/ LITTLE GRAVEL

NO VU SEEN

0848

RR- 00062

SOIL SAMPLE #62

IS TAKEN

SHEET #006117

SP- 138521

TEXTURE: SANDY W/ LITTLE GRAVEL

0848

NO VU SEEN

0918

GPS SAMPLE LOCATION OF #56 TAKEN

0919

GPS LOCATION OF SOIL SAMPLE #57 TAKEN

0920

GPS LOCATION OF SOIL SAMPLE #58 TAKEN

0922

GPS LOCATION OF SOIL SAMPLE #59 TAKEN

Location MP 1341Date 9-25-08Project / Client BNSF

0923 GPS OF SOIL SAMPLE #60 TAKEN

0924 GPS OF SOIL SAMPLE #61 TAKEN

0925 GPS OF SOIL SAMPLE #62 TAKEN

0927 GPS OF STATIONARY PUMP BA-00068

U BA-00067 TAKEN

0927 GPS OF STATIONARY PUMP BA-00066  
TAKEN

0929 GPS OF STATIONARY PUMP BA-00063

U BA-00064 TAKEN

AD 0929 GPS OF STATIONARY PUMP BA-00060

0930 GPS OF WEATHER STATION TAKEN

0930 GPS OF STATIONARY PUMP #BA-00065  
TAKENNOTE BEGAN RAINING NOW  
ALL GPS LOCATIONS TAKEN BY  
MATY LENZ OF GMR

Libby, MT & Troy, MT  
BNSF Rail Maintenance  
Activity Based Sampling  
Fieldbook # 2 (ABS)

Start Date  
09-17-08



*"Rite in the Rain"*

ALL-WEATHER  
ENVIRONMENTAL

No. 550



*"Rite in the Rain"*  
ALL-WEATHER WRITING PAPER



# ALL-WEATHER ENVIRONMENTAL FIELD BOOK

Name \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_

Project \_\_\_\_\_

**This book is printed on "Rite in the Rain" All-Weather Writing Paper - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.**

Specifications for this book:

Page Pattern		Cover Options	
Left Page	Right Page	Polydura Cover	Fabrikoid Cover
Columnar	1/4" Grid	Item No. 550	Item No. 550F

## CONTENTS.

[illegible]

## Reference Page Index

147 Error codes, Hazardous classifications, Container types  
148 Sampling guidelines (Liquids)  
149 Sampling guidelines (Solids)  
150 Approximate Volume of Water in Casing or Hole, Ground Water Monitoring Well  
151 PVC Pipe casing tables  
152 Soil Classification  
153 Soil Classification  
154 Conversions (Length, Weight, Volume, Temp, etc...)  
155 Conversions (Concentrations, Volume/Flow or Time, Velocity, Acceleration)  
156 Maximum Concentration of Contaminants for the Toxicity Characteristic

0600: Arrive at BNSF safety meeting  
0630: Personal Pumps started for  
(two) activity based samples & OSHA (six)  
0700: EMR leaves safety meeting site  
to Ripley MP-1312.  
0710: EMR holds tailgate safety  
meeting. Begin setting up  
stationary pumps  
0730: Generator not working properly.  
Not enough power for south side  
pumps  
0735: North side pumps started  
0747: Trespasser ABS samples started.  
0830: Scott Carney leaves site to  
return generator  
0850 M. Lenz begins videotaping  
track maintenance crew  
0910: Scott C back on site with new  
generator.  
0915 Pumps on south side of track  
\* started  
1035: Cribber passed pump areas  
1144: Pumps check and rates unchanged  
Ontonagon pump dropped from 2.8  
to 2.5

4 Location MP 1312 Date 9/17/08  
Project / Client BNSF-ROW

1200: Pumps checked and rates are unchanged

1315 Anchor machine passes pumps

1250: stationary pump samples collected

1343 ML 9/17/08 Trespasser samples taken

1400 EMR offsite

ML 9/17/08  
**BA- 00001**

ABS  
started 0636 2.8 lpm  
stopped 1436

ML 9/17/08  
**BA- 00002**

ABS  
started 0636 2.8 lpm  
stopped 1436

ML 9/17/08  
**BA- 00003**

ABS  
0749 start 2.8 lpm  
1348 stop 2.8 lpm

ML 9/17/08  
**BA- 00004**

ABS  
start 0749 2.8 lpm  
stop 1343

ML 9/17/08  
**BA- 00005**

ABS  
0753 start 2.8 lpm  
1400 stopped

ML 9/17/08  
**BA- 00006**

> 0911 start 7.6 lpm  
1305 stop

**SP- 138440**

0912 start 7.6 lpm  
1304 stop

ML 9/17/08  
**BA- 00007**

**SP- 138441**

Location MP-1312 Date 9/17/08  
Project / Client BNSF-ROW

ML 9/17/08

**BA- 00008**

0734 start  
1255 stop 7.6 lpm

**SP- 138442**

ML 9/17/08

**BA- 00009**

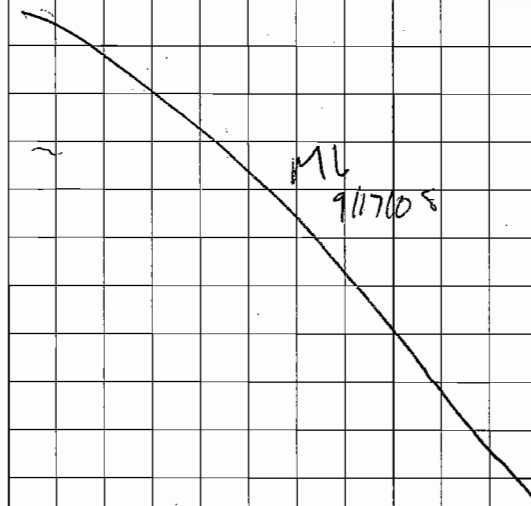
0737 start  
1253 stop 7.6 lpm

**SP- 138443**

ML 9/17/08

**BA- 00010**

Blank



Location MP-1331.5 Date 9/18/08Project / Client BNSF-ROW

ML	<del>Engle Victor</del> BA- 00011	0638 start 1502 stop	1.4 lpm
ML	<del>Victor Eric P</del> BA- 00012	0648 start 1459 stop	1.4 Lpm
ML	Dave BA- 00013	1000 start 1555 stop	2.8 Lpm
MY	Amanda BA- 00014	1000 start 1555 stop	start 2.8 stop 2.6
ML	Matt BA- 00015	1015 start 1556 stop	started 2.8 stop 2.7
ML	stationary BA- 00016	0958 start 1550 stop	7.6 Lpm
ML	SP-138444 BA- 00017	0958 start 1550 stop	7.6 LPM
ML	SP-138445 BA- 00018	1011 start 1545 stop	7.6 LPM
ML	SP-138446 BA- 00019	1012 start 1544 stop	7.6 LPM
ML	SP-138447 BA- 00020	Blank	

Location MP-1331.5Date 9/18/08Project / Client BNSF-ROW

0600	safety meeting at crossroads
0630	start activity based sampling
0700	Offsite
0730	Arrive at MP 1331.5
	EMR decides where sampling should occur, safety meeting
0745	EMR prepares for BNSF Track personnel to reach sampling area
0900	BNSF workers approaching
0930	Pumps (stationary) started
0950	Trespasser pumps started
1015	Tie pullers pass by
1030	Speed swing & plate puller pass
1100	J. Starr checks stationary pumps Flow Rates have not changed
1120	Tie plugger passes by
1130	Cribber passes by
1136	M. Lenz offsite to resolve GPS issues
1219	Rail reset crane to the end of work area 1st equipment to end since Cribber.

Location MP 1331.5 Date 9/18/08  
 Project / Client BNSF-ROW

- 1300 M. Lenz returns and takes GPS coordinates of soil sample areas and stationary pumps
- 1340 Reset crane and welding truck stopped & have been for 30 minutes
- 1345 ABS pumps checked for flow rate  
 Matt's pump at 2.7 Lpm  
 Amanda's pump at 2.4 Lpm  
 Dave's pump at 2.8 Lpm
- 1350: Train passes by
- 1400: ML GPS station
- 1540: Last of equipment passes
- 1545: Pull stationary samples
- 1556: Pull trespasser pump samples
- 1615: Downloaded Met Data to laptop
- 1630 off site

Location MP-1330.5 1331 Date 9/19/08  
 Project / Client BNSF-ROW

- 0645: Arrive to BNSF safety meeting
- 0648: Start BNSF personal samples
- 0715: Train passes by
- 0720: Stationary pumps set up and started
- 0730: Trains have been passing on main work will begin shortly
- 0740: Speed swing
- 0750: Train passes on main
- 0808: Tie pulleys pass
- 0810: Workers cutting rail
- 0815: EMR soil sampling site location.
- 0820: EMR videotapes work
- 0830: M. Lenz checks personal pumps  
 Amanda's pump dropped from 2.8 to 2.7 Lpm  
 Dave & Matt's still at 2.8 Lpm
- J. Starr checks stationary pumps
- 0835: Rail moved off siding
- 0840: work has stopped due to inoperable machine
- 0850: Reset crane moves inoperable machine off siding
- 0900: Tie plugger passes soil sample
- 0940: Paul reset crane passes.
- 0941: welding truck passes



Location MD-1331 ML 9/19/08 Date 9/19/08  
 Project / Client BNSF-ROW

0920: Dave Welch gives personal sample  
 to John Starr, Dave leaves  
 site to make phone call regarding  
 next week

0945: Mlene takes GPS points at  
 soil, Airg amphet, and Met station

0950: Spike ~~puller~~ passes  
 ML  
 9/19/08

1005: Anchor machine passes

1110: Spike magnet passes.

1130: CBM offsite

1135 Dave returns to site

1140 Last of equipment passes.

1150 EMR pulls stationary pumps

1200 EMR begins taking down equipment

1230: EMR pulls Trespasser samples

1300: EMR offsite

Location MD-1331 ML 9/19/08 Date 9/19/08  
 Project / Client BNSF-ROW

BA-00021 start 0630 2.8 Lpm ML 9/23/08  
 stop 1223

ML  
 BA-00022 start 0628 2.8  
 stop 1231

ML  
 BA-00023 start 0648 2.8 Lpm  
 stop 1231

ML  
 BA-00024 start 0648 2.6 Lpm  
 stop 1241

ML  
 BA-00025 start 0648 2.8 Lpm  
 stop 1241

ML  
 BA-00026

ML  
 SP-138448 0729 start 7.6 Lpm  
 1147 stop

ML  
 BA-00027 Blank

ML  
 BA-00028 0729 start 7.6 Lpm  
 1148 stop

ML  
 SP-138449

Location MP-1329.8 ML 9/23/08 Date 9/22/08  
 Project / Client BNSF  
Rainy, cloudy. 54°F

0600:	safety meeting
0630:	started BNSF ABS personal pumps Flow 2.8 Lpm
0700:	Rain starts to fall. EMR goes offsite to determine if sampling is to be performed
0900:	OK to sample given by Scott Carney. Rain has stopped
0940:	M. Lenz & Amanda start trespasser pumps at 2.8 Lpm
0950:	EMR is in wrong location. work Thought to be at 1329 is more at 1329.5. EMR Moves to new location at 1328.
1050:	Dave & stationary ABS pumps started.
1100:	<del>Anchor</del> <sup>puller</sup> and speed swing have already passed.
1110:	Workers are grinding and blowing concrete ties
1120:	Rain starts
1130:	Amanda T. and Dave W. start sampling soil. Rain stopped
1159:	Rail Reset crane passes by

Location MP-1329.8 Date 9/22/08  
 Project / Client BNSF ML 9/23/08

1210:	Welding truck passes by
1215:	M. Lenz checks personal pumps on trespassers. Mike's pump down to 2.7 lpm Amanda's pump 2.7 lpm Dave's pump 2.8 lpm
1220:	Rail anchors being set
1300:	Last of equipment passes
1318:	BNSF personal samples pulled
1458:	Pumps pulled EMR offsite

BA- 00029

start 0629 2.8  
stop 1318 Lpm

BA- 00030

start 0629 2.8 lpm  
stop 1318

BA- 00031

start 0941 2.6 lpm  
stop 1435

BA- 00032

start 0946 2.7 Lpm  
stop 1435

BA- 00033

start 1030 2.8 Lpm  
stop 1425

BA- 00034

start 1051 7.6 Lpm  
stop 1437

SP- 138450

Location MP-1329.8 Date 9/22/08  
 Project / Client BNSF mr  
9/23/08

BA- 00035

SP- 138451

BA- 00036

start 1057  
 stop 1437 7.6 Lpm

Blank

Location MP-1337 Date 9/23/08  
 Project / Client BNSF  
Foggy, Cloudy 38°F

0600: Safety meeting Troy Depot  
 0630: Pumps started  
 0700: Move to location begin setup  
 0720: All Trespasser pumps have been started  
 0721: AT 0715 rail was already being cut.  
 0727: South stationary pumps started  
 0730: Spike puller passes  
 0745: North side stationary pumps started  
 0756: Anchor puller passes  
 0815: Cooper passes  
 0835: Rail expander passes  
 0840: Cribber passes  
 0849: Rail reset crane puts new rail in place  
 0913: Spikers pass  
 0920: ML checks Trespasser pumps.  
 ML's pump down to 2.7 Lpm  
 AT pump down to 2.7 Lpm  
 DW pump down to 2.6 Lpm  
 0930: ML checks pumps on North & South side of tracks (stationary)

Location MP-1337 Date 9/23/08Project / Client BNSF

940 The "bomb" passes by  
 1000 AT&DW finish soil sampling  
 015 Muenz takes GPS points  
 of stationary pumps soil  
 and met station  
 1020 1 south side of track generator  
 not working, can't restart  
 BA-00043 & BA-00042  
 Pump Fault  
 1030 Last of equipment passes  
 by  
 1050 EMR begins take down  
 1150 EMR pulls stationary and personals

BA- 00037

BA- 00038

BA- 00039

BA- 00040

BA- 00041

Location \_\_\_\_\_ Date \_\_\_\_\_

Project / Client \_\_\_\_\_

BA- 00042

SP- 138452

BA- 00043

SP- 138453

BA- 00044

SP- 138454

BA- 00045

SP- 138455

BA- 00046

Blank

124

Location MP-1339.5Date 9/24/08Project / Client BNSF48°F, cloudy

- 0600: BNSF safety meeting at Troy yard.
- 0620: ABS personnel started for BNSF personnel
- 0645: EMR will sample second stretch of track.
- 0710: EMR leaves to pick up fixed generator from Rick's Rental in Libby
- 0858: EMR onsite. Begins unpacking equipment.
- 0908: Personal Trespasser samples have been turned on running at 2.8 Lpm. Met station running
- 0912: stationary pumps running at 7.6 Lpm.
- 0915: Declipper machines pass by removing clips holding rail to concrete ties
- 0930: Magnet Machine passed by
- 0945: Rail reset crane passes by setting in new rail
- 1000: J. Starr checks stationary pumps. All running at 7.6 Lpm.

Location MP-1339.5Date 9/24/08Project / Client BNSF

- 1005: soil sampling started at 0930
- 1015: Leaf blower passes by cleaning of concrete ties. Visible dust.
- 1105: Grasper passes by
- 1115: Welding truck passes
- 1120: Tamper passes
- 1122: Amanda and Dale Welch finished sampling soil
- 1130: M. Lenz takes GPS points at soil locations and ABS stationary samples
- 1155: The bomb passes by. Anchors are set by workers. Machine follows and locks into place.
- 1225: Last of equipment passes
- 1309: J. Starr ~~now~~ goes to Yank yard to take ~~off~~ ABS
- 1500: EMR OFFsite

ML  
9/24/08  
ML  
9/24/08  
ML  
9/24/08  
ML  
9/24/08

BA- 00047

BA- 00048

BA- 00049

BA- 00050

start	1309	0617	2.8 Lpm
stop	1309		
start	0619		2.8 Lpm
stop	1315		
start	0907		2.7 Lpm
stop	1359		
start	0907		2.7 Lpm
stop	1400		



Location MP-1339.5 Date 9/24/08Project / Client BNSF

BA- 00051

start 0907  
stop 1400 2.7 Lpm

BA- 00052

0909 start  
stop 1243 7.6 Lpm

SP- 138456

BA- 00053

start 0910  
stop 1243 7.6 LpmML  
9/24/08  
SP- 138457

BA- 00054

start 0911  
stop 1246 7.6 Lpm

SP- 138458

BA- 00055

start 0911  
stop 1246 7.6 Lpm

SP- 138459

BA- 00056

Field Blank

BA- 00057

Lot Blank

Location MP-1341Date 9/25/08Project / Client BNSF

48°F, Cloudy,

BA- 00058

start 0623  
stop 0925 2.8 Lpm

BA- 00059

start 0625  
stop 0924 2.8 Lpm

BA- 00060

start 0653  
stop 1030 2.8 Lpm

BA- 00061

start 0655  
stop 1040 2.8 Lpm

BA- 00062

start 0656  
stop 1031 2.8 Lpm

BA- 00063

start 0728  
stop 1002 7.6 Lpm

SP-138460

BA- 00064

CO located sample  
start 0728  
stop 1002 7.6 Lpm

SP-138460

BA- 00065

start 0728  
stop 1003 7.6 Lpm

SP-138461

BA- 00066

start 0725  
stop 0959 7.6 Lpm

SP-138462

Location MP-1341 Date 9/25/08Project / Client BNSF**BA- 00067**

SP-138463

start 0725  
stop 1000 7.6 rpm

co located sample

**BA- 00068**

SP-138463

start 0725 7.6 rpm  
stop 1000

0600 BNSF safety meeting at Troy yard  
 0620 ABS samples started on BNSF workers  
 0700 Arrive at MP-1341 start Trespasser  
 ABS samples. set up weather  
 station. safety meeting  
 0725 start stationary samples  
 BA-00064 & BA-00068  
 are co-located samples  
~~0730~~ 0730 EMR starts soil sampling  
 0731 Clip supply passes to the west  
 0732 Declipper passes  
 0738 Declipper passes  
 0745 speed swing passes to east  
 0749 speed swing passes to west  
 0757 crew prepping ties  
 0805 Gooper passes  
 0824 welding truck passes

Location \_\_\_\_\_ Date \_\_\_\_\_

Project / Client \_\_\_\_\_

0848 Bomb, <sup>passes</sup> spiker

0853 spiker passes

**BA- 00069**

Field Blank

0900 Magnet machine passes  
 0920 All machines passed  
 0930 Starts raining  
 0931: Pumps checked for flow  
 0 Atlantic's 2.8  
 M Lenz 2.8  
 Taves 2.7  
 All stations ~~2.7~~ 2.6 Lpm  
 1000 Stationary pump samples  
 pulled  
 1030 Met station downloaded  
 Rain stopped light mist, rain  
 did not accumulate  
 ABS personals pulled  
 1040 Personal Trespasser pumps pulled  
 1050 Final cleanup  
 1059 EMR off site

## Video Log

## Disc Time

9/17/08 MP-1312

Disc 1

.01 sec BNSF safety meeting  
 26 sec Pumps (ABS) assigned to rail workers

43 sec Air Monitoring Area

1.00 min spike puller

1.3 min crew working

23 min cribber machine

3 min cribber passing

4.20 min Rail reset crane

6.36 min Rail work

7.3 min line of machines

8.4 min Anchor machine

8.41 min Magnet pulling spikes For Scrap

9.3 min soil samples

9/18/08 MP-1331.5

9.41 Rail reset crane

10.4 Trespasser start sampling

11.24 360° view sampling Area road work

12.20 speed swing

12.50 Ballast being moved

13.56 Rail work

14.04 Trespassers (real) on tracks

## Video Log (cont.)

9/18/08 1331.5

Disc 1

15.39 min welding Truck  
 15.5 Air Sampling Area  
 Met station

18.01 - Train passing

18.22 worker with pump

18.40 spiker machine magnet passing

9/19/08 MP-1331

19.15 Met station location

20.05 360° view of sample Area

20.50 worker cutting rail

21.19 Rail Maintenance

9/22/08 MP-1331  
 9/19/08

Disc 2

.01 sec soil samplers

.21 south side of rail not  
 Air sampled

.56 Rail Reset crane

1.15 Rail Maintenance

1.59 Machine inoperable (hydraulic line)

2.29 Crane removing machine

5.45 Ballast being moved

6.06 Grinding rail - welding Truck

## Video Log

9/22/08 MP-1329.8

- 8.09 360° view of sampling Area
- 8.40 workers using leaf blower
- 9.10 Air samples
- 9.30 Rail work
- 1000 Mile post location

9/23/08 MP-1337

- 1001 360° of work Area
- 1030 spike puller
- 1130 Goopers applying adhesive
- 1140 Rail work
- 1200 The "Bomb" machine

9/24/08 MP-1339.5

- 1230 Anchor puller/Declipper
- 1300 360° of work area
- 1400 Goopers
- 1430 The bomb machine
- 1450 workers putting clips on ties

9/25/08 MP-1341

- 1500 360° of work area
- 1550 Declipper
- 1630 Rail work
- 1712 soil samplers
- 1730 rail reset crane
- 1740 The bomb

~~1800~~

9/25/08

MP-1341

1800

Rail work

ML  
9/25/08





## APPENDIX C

### FIELD SAMPLING DATA SHEETS – AIR

**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No. 550-1 Page No. 6 Sampling Date: 9/17/08  
 Address: BNSF ROW Owner/Tenant: BNSF  
 Business Name: NA  
 Land Use: Residential School Commercial Mining Roadway Other (ROW)  
 Sampling Team: GDM Other EMR Names: MC  
 Person Sampled/Co. Name: ERIC PAYLACK / BNSF SSN: 0146 Task: LABORER

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00001</b>		
Location ID	<b>AD-005568</b>		
Sample Group	<b>Property</b>		
Location Description	<b>MP 1312</b>		
Category (circle)	<input checked="" type="radio"/> FS FB (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)
Matrix Type (circle)	Indoor <input checked="" type="radio"/> Outdoor	Indoor Outdoor	Indoor Outdoor
Filter Diameter (circle)	<input checked="" type="radio"/> 25mm <input type="radio"/> 37mm	25mm 37mm	25mm 37mm
Pore Size (circle)	TEM- 45 <input checked="" type="radio"/> PCM- 0.8	TEM- 45 PCM- 0.8	TEM- 45 PCM- 0.8
Flow Meter Type (circle)	<input checked="" type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number	<b>4091</b>		
Flow Meter ID No.	<b>VFB-65</b>		
Start Date	<b>9/17/08</b>		
Start Time	<b>0636</b>		
Start Flow (L/min)	<b>2.8 Lpm</b>		
Stop Date	<b>9/17/08</b>		
Stop Time	<b>1436</b>		
Stop Flow (L/min)	<b>2.8</b>		
Pump fault? (circle)	<input checked="" type="radio"/> No Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No <input checked="" type="radio"/> Yes NA	No Yes NA	No Yes NA
Sample Type	TWA EXC <input checked="" type="radio"/> NA	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number			
Archive Blank (circle): Yes No	Yes No	Yes No	Yes No
Volpe:			
Entered (LFO)	Entered Validated	Entered Validated	Entered Validated

For Field Team Completion  
(Provide Initials) **MC**

Completed by **MC**

QC by

**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No: 550 Page No: 6 Sampling Date: 9/17/08  
 Address: BNSF ROW Owner/Tenant: BNSF  
 Business Name: NA  
 Land Use: Residential School Commercial Mining Roadway Other ( ROW )  
 Sampling Team: CDM Other EMR Names: \_\_\_\_\_  
 Person Sampled/Co. Name: Victor Bachmeier / BNSF SSN: 2767 Task: CRIB OPERATOR

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00002</b>		
Location ID	<u>AD- 005568</u>		
Sample Group	<u>Property</u>		
Location Description	<u>MP 1312</u>		
Category (circle)	<u>FS</u> FB-(field blank) LB-(lot blank)	FS FB-(field blank) LB-(lot blank)	FS FB-(field blank) LB-(lot blank)
Matrix Type (circle)	Indoor <u>Outdoor</u>	Indoor Outdoor	Indoor Outdoor
Filter Diameter (circle)	<u>25mm</u> 37mm	25mm 37mm	25mm 37mm
Pore Size (circle)	TEM- .45 <u>PCM- 0.8</u>	TEM- .45 PCM- 0.8	TEM- .45 PCM- 0.8
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number			
Flow Meter ID No.	<u>UFB-65</u>		
Start Date	<u>9/17/08</u> <u>9/17/08</u>		
Start Time	<u>636</u> <u>1432</u>		
Start Flow (L/min)	<u>2.8 L/min</u> <u>2.8</u>		
Stop Date			
Stop Time	<u>1432</u>		
Stop Flow (L/min)	<u>2.8</u>		
Pump fault? (circle)	<u>No</u> Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No <u>Yes</u> NA	No Yes NA	No Yes NA
Sample Type	TWA EXC <u>NA</u>	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number: _____			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO) _____	Volpe: _____ Entered _____ Validated _____	Volpe: _____ Entered _____ Validated _____	Volpe: _____ Entered _____ Validated _____

 For Field Team Completion  
 (Provide Initials)

Completed by

QC by

## LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR STATIONARY AIR

Field Logbook No: 1 Page No: 6 Sampling Date: 9/17/08  
 Address: BNSF ROW Owner/Tenant: BNSF  
 Business Name: NA  
 Land Use: Residential School Commercial Mining Roadway (Other) ROW  
 Sampling Team: CDM Other EMR Names: \_\_\_\_\_

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00010</b>		
Location ID	<u>Blank</u>		
Sample Group	<u>Property</u> <sup>ML 11/10/08</sup> <u>Blank</u>	<u>Property</u>	<u>Property</u>
Location Description	<u>Blank</u>		
Category (circle)	FS <u>FB (field blank)</u> LB (lot blank) DB (prep-dry blank)	FS <u>FB (field blank)</u> LB (lot blank) DB (prep-dry blank)	FS <u>FB (field blank)</u> LB (lot blank) DB (prep-dry blank)
Matrix Type (circle)	Indoor <u>Outdoor</u> NA	Indoor <u>Outdoor</u> NA	Indoor <u>Outdoor</u> NA
Filter Diameter (circle)	<u>25mm</u> 37mm	<u>25mm</u> 37mm	<u>25mm</u> 37mm
Pore Size (circle)	<u>TEM- .45</u> <u>PCM- 0.8</u>	<u>TEM- .45</u> <u>PCM- 0.8</u>	<u>TEM- .45</u> <u>PCM- 0.8</u>
GPS Status (circle)	Collected Previously Collected Not Collected-no signal (3 attempts) <u>Not Collected-not required for sample</u>	Collected Previously Collected Not Collected-no signal (3 attempts) Not Collected- not required for sample	Collected Previously Collected Not Collected-no signal (3 attempts) Not Collected- not required for sample
GPS File (fill in or circle)	Filename: _____ NA	Filename: _____ NA	Filename: _____ NA
Flow Meter Type (circle)	Rotometer DryCal <u>NA</u>	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number			
Flow Meter ID No.			
Start Date			
Start Time			
Start Flow (L/min)			
Stop Date			
Stop Time			
Stop Flow (L/min)			
Pump fault? (circle)	No Yes NA	No Yes NA	No Yes NA
MET Station onsite? (circle)	No <u>Yes</u> NA	No <u>Yes</u> NA	No <u>Yes</u> NA
Sample Type (circle)	Pre Post Clear 2 <sup>nd</sup> Clear 3 <sup>rd</sup> Clear NA	Pre Post Clear 2 <sup>nd</sup> Clear 3 <sup>rd</sup> Clear NA	Pre Post Clear 2 <sup>nd</sup> Clear 3 <sup>rd</sup> Clear NA
Field Comments			
Cassette Lot Number:			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO): _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____



**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No: 2 Page No: 4 Sampling Date: 9/18/08  
 Address: BNSF-ROW Owner/Tenant: BNSF  
 Business Name: NA  
 Land Use: Residential School Commercial Mining Roadway Other (ROW)  
 Sampling Team: CDM Other EMR Names: Math Lenz  
 Person Sampled/Co. Name: Victor Schneider / BNSF SSN: 2767 Task: Crib operator

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00011</b>		
Location ID	<b>AD-005568</b>		
Sample Group	<b>Property</b>		
Location Description	<b>Libby - MP1331.5</b>		
Category (circle)	<u>FS</u> FB-(field blank) LB-(lot blank)	FS FB-(field blank) LB-(lot blank)	FS FB-(field blank) LB-(lot blank)
Matrix Type (circle)	Indoor <u>Outdoor</u>	Indoor Outdoor	Indoor Outdoor
Filter Diameter (circle)	<u>25mm</u> 37mm	25mm 37mm	25mm 37mm
Pore Size (circle)	TEM- .45 <u>PCM- 0.8</u>	TEM- .45 PCM- 0.8	TEM- .45 PCM- 0.8
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	Rotometer DryCal <u>NA</u>	Rotometer DryCal NA
Pump ID Number	<b>4098</b>		
Flow Meter ID No.	<b>VFB-65</b>		
Start Date	<b>9/18/08</b>		
Start Time	<del>0648</del> <b>0638</b>		
Start Flow (L/min)	<b>1.4</b>		
Stop Date	<b>9/18/08</b>		
Stop Time	<b>1502</b>		
Stop Flow (L/min)	<b>1.4</b>		
Pump fault? (circle)	<u>No</u> Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No <u>Yes</u> NA	No Yes NA	No Yes NA
Sample Type	TWA EXC <u>NA</u>	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number: <b>7198170164</b>			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO) _____	Volpe: _____ Entered _____ Validated _____	Volpe: _____ Entered _____ Validated _____	Volpe: _____ Entered _____ Validated _____

For Field Team Completion  
(Provide Initials)

Completed by **ML**

QC by **SLC**

**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No: 2 Page No: 4 Sampling Date: 9/18/08  
 Address: BNSF-ROW Owner/Tenant: BNSF  
 Business Name: NA  
 Land Use: Residential School Commercial Mining Roadway Other (ROW)  
 Sampling Team: CDM Other EMR Names: Math Lenz  
 Person Sampled/Co. Name: Eric Paulack 1 BNSF SSN: 0145 Task: Laborer

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00012</b>		
Location ID	AD-005568		
Sample Group	Property		
Location Description	Libby - MP 1331.5		
Category (circle)	<u>FS</u> FB-(field blank) LB-(lot blank)	FS FB-(field blank) LB-(lot blank)	FS FB-(field blank) LB-(lot blank)
Matrix Type (circle)	Indoor <u>Outdoor</u>	Indoor Outdoor	Indoor Outdoor
Filter Diameter (circle)	<u>25mm</u> 37mm	25mm 37mm	25mm 37mm
Pore Size (circle)	TEM- .45 <u>PCM- 0.8</u>	TEM- .45 PCM- 0.8	TEM- .45 PCM- 0.8
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number	1091		
Flow Meter ID No.	VFB-65		
Start Date	9/18/08		
Start Time	0648		
Start Flow (L/min)	1.4		
Stop Date	9/18/08		
Stop Time	1459		
Stop Flow (L/min)	1.4		
Pump fault? (circle)	<u>No</u> Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No <u>Yes</u> NA	No Yes NA	No Yes NA
Sample Type	TWA EXC <u>NA</u>	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number: <u>719870164</u>			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO) _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____

 For Field Team Completion  
 (Provide Initials)
Completed by MLQC by SJC

## LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR STATIONARY AIR

Field Logbook No: 2 Page No: 4 Sampling Date: 9/18/08  
 Address: BNSF ROW Owner/Tenant: BNSF  
 Business Name: NA

Land Use: Residential School Commercial Mining Roadway Other ( ROW )

Sampling Team: CDM Other EMR Names: John Starr, Scott Carney

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<u>ML 9/18/08</u> <b>BA- 00019</b>	<b>BA- 00020</b>	
Location ID	<b>SP- 138447</b>	Blank	
Sample Group	Property	Blank	
Location Description	MP1331.5	Blank	
Category (circle)	<input checked="" type="radio"/> FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank) <input type="radio"/> DB (prep-dry blank)	<input checked="" type="radio"/> FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank) <input type="radio"/> DB (prep-dry blank)	<input checked="" type="radio"/> FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank) <input type="radio"/> DB (prep-dry blank)
Matrix Type (circle)	Indoor <input checked="" type="radio"/> Outdoor <input type="radio"/> NA	Indoor <input type="radio"/> Outdoor <input checked="" type="radio"/> NA	Indoor <input type="radio"/> Outdoor <input type="radio"/> NA
Filter Diameter (circle)	<input checked="" type="radio"/> 25mm <input type="radio"/> 37mm	<input checked="" type="radio"/> 25mm <input type="radio"/> 37mm	<input checked="" type="radio"/> 25mm <input type="radio"/> 37mm
Pore Size (circle)	<input checked="" type="radio"/> TEM- .45 <input type="radio"/> PCM- 0.8	<input checked="" type="radio"/> TEM- .45 <input type="radio"/> PCM- 0.8	<input checked="" type="radio"/> TEM- .45 <input type="radio"/> PCM- 0.8
GPS Status (circle)	<input checked="" type="radio"/> Collected <input type="radio"/> Previously Collected <input type="radio"/> Not Collected-no signal (3 attempts) <input type="radio"/> Not Collected-not required for sample	<input checked="" type="radio"/> Collected <input type="radio"/> Previously Collected <input type="radio"/> Not Collected-no signal (3 attempts) <input type="radio"/> Not Collected- not required for sample	<input checked="" type="radio"/> Collected <input type="radio"/> Previously Collected <input type="radio"/> Not Collected-no signal (3 attempts) <input type="radio"/> Not Collected- not required for sample
GPS File (fill in or circle)	Filename: <u>BNSF-ROW</u> NA	Filename: <u>BNSF-ROW</u> NA	Filename: <u>BNSF-ROW</u> NA
Flow Meter Type (circle)	<input checked="" type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	<input checked="" type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	<input checked="" type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA
Pump ID Number	802365		
Flow Meter ID No.	PFKS-1		
Start Date	9/18/08		
Start Time	1012		
Start Flow (L/min)	7.6		
Stop Date	9/18/08		
Stop Time	1544		
Stop Flow (L/min)	7.6		
Pump fault? (circle)	<input checked="" type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA	<input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA	<input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA
MET Station onsite? (circle)	<input type="radio"/> No <input checked="" type="radio"/> Yes <input type="radio"/> NA	<input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA	<input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA
Sample Type (circle)	Pre <input type="radio"/> Post <input type="radio"/> Clear <input checked="" type="radio"/> 2 <sup>nd</sup> Clear <input type="radio"/> 3 <sup>rd</sup> Clear <input type="radio"/> NA	Pre <input type="radio"/> Post <input type="radio"/> Clear <input checked="" type="radio"/> 2 <sup>nd</sup> Clear <input type="radio"/> 3 <sup>rd</sup> Clear <input type="radio"/> NA	Pre <input type="radio"/> Post <input type="radio"/> Clear <input type="radio"/> 2 <sup>nd</sup> Clear <input type="radio"/> 3 <sup>rd</sup> Clear <input type="radio"/> NA
Field Comments			
Cassette Lot Number: <u>719870164</u>			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO): _____	Volpe: _____ Entered _____ Validated _____	Volpe: _____ Entered _____ Validated _____	Volpe: _____ Entered _____ Validated _____

For Field Team Completion (Provide Initials)

Completed by: MLQC by: SJC

**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No: 2 Page No: 11 Sampling Date: 9/19/08  
 Address: BNSF-ROW Owner/Tenant: BNSF  
 Business Name: N/A  
 Land Use: Residential School Commercial Mining Roadway Other (ROW)  
 Sampling Team: CDM Other EMR Names: Math Lenz  
 Person Sampled/Co. Name: Eric Paulack / BNSF SSN: 0145 Task: laborer

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00021</b>		
Location ID	AD-005568		
Sample Group	Property		
Location Description	MP 1330.5 (33) ML 9/19/08		
Category (circle)	<input checked="" type="radio"/> FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)	FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)	FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)
Matrix Type (circle)	Indoor <input type="radio"/> Outdoor <input checked="" type="radio"/>	Indoor <input type="radio"/> Outdoor <input type="radio"/>	Indoor <input type="radio"/> Outdoor <input type="radio"/>
Filter Diameter (circle)	<input checked="" type="radio"/> 25mm <input type="radio"/> 37mm	25mm <input type="radio"/> 37mm	25mm <input type="radio"/> 37mm
Pore Size (circle)	TEM- 45 <input type="radio"/> PCM- 0.8 <input checked="" type="radio"/>	TEM- 45 <input type="radio"/> PCM- 0.8 <input checked="" type="radio"/>	TEM- 45 <input type="radio"/> PCM- 0.8 <input type="radio"/>
Flow Meter Type (circle)	<input checked="" type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	Rotometer <input type="radio"/> DryCal <input type="radio"/> NA
Pump ID Number	4100		
Flow Meter ID No.	VFB-65		
Start Date	9/19/08		
Start Time	0630		
Start Flow (L/min)	2.8		
Stop Date	9/19/08		
Stop Time	1223		
Stop Flow (L/min)	2.8		
Pump fault? (circle)	<input checked="" type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA
MET Station onsite?	No <input checked="" type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA
Sample Type	TWA <input type="radio"/> EXC <input checked="" type="radio"/> NA	TWA <input type="radio"/> EXC <input type="radio"/> NA	TWA <input type="radio"/> EXC <input type="radio"/> NA
Field Comments			
Cassette Lot Number	7198170164		
Archive Blank (circle): Yes No	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
Volpe:			
Entered (LFO) Entered Validated	Entered Validated	Entered Validated	Entered Validated

For Field Team Completion  
(Provide Initials)

Completed by

QC by



**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No. 2 Page No. 11 Sampling Date: 9/19/08  
 Address: BNSF Row Ownership: BNSF  
 Business Name: N/A  
 Land Use: Residential School Commercial Mining Roadway Other (Row)  
 Sampling Team: CDM Other EMR Names: Mark Lenz  
 Person Sampled/Co. Name: Vitor Bachmeier <sup>9/19/08</sup> BNSF SSN: 2167 Task: Crib operator

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00022</b>		
Location ID	AD-005568		
Sample Group	Property		
Location Description	MP 1330.5 1331 ML 9/19/08		
Category (circle)	<input checked="" type="radio"/> FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)	FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)	FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)
Matrix Type (circle)	Indoor <input checked="" type="radio"/> Outdoor	Indoor <input type="radio"/> Outdoor	Indoor <input type="radio"/> Outdoor
Filter Diameter (circle)	<input checked="" type="radio"/> 25mm <input type="radio"/> 37mm	25mm <input type="radio"/> 37mm	25mm <input type="radio"/> 37mm
Pore Size (circle)	TEM- 45 <input checked="" type="radio"/> PCM- 0.8	TEM- 45 <input type="radio"/> PCM- 0.8	TEM- 45 <input type="radio"/> PCM- 0.8
Flow Meter Type (circle)	<input checked="" type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	Rotometer <input type="radio"/> DryCal <input type="radio"/> NA
Pump ID Number	4018		
Flow Meter ID No.	VFB-65		
Start Date	9/19/08		
Start Time	0528 0628		
Start Flow (L/min)	2.8		
Stop Date	9/19/08		
Stop Time	1231		
Stop Flow (L/min)	2.8		
Pump fault? (circle)	<input checked="" type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA
MET Station onsite?	No <input checked="" type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA
Sample Type	TWA <input type="radio"/> EXC <input checked="" type="radio"/> NA	TWA <input type="radio"/> EXC <input type="radio"/> NA	TWA <input type="radio"/> EXC <input type="radio"/> NA
Field Comments			
Cassette Lot Number	7198170164		
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO)	Volpe: Entered Validated	Volpe: Entered Validated	Volpe: Entered Validated

For Field Team Completion  
(Provide Initials)

Completed by

QC by

## LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR STATIONARY AIR

Field Logbook No: 2 Page No: 11 Sampling Date: 9/19/08  
 Address: BNSF ROW Owner/Tenant: BNSF  
 Business Name: NA

Land Use: Residential School Commercial Mining Roadway Other (ROW) (ROW)  
 Sampling Team: CDM Other EMR Names: Sohn Starr, Dave Welch

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<u>9-19-08</u> <b>BA- 00026</b>	<u>9-19-08</u> <b>BA- 00027</b>	<u>9-19-08</u> <b>BA- 00028</b>
Location ID	<b>SP- 138448</b>	<u>Blank</u>	<b>SP- 138449</b>
Sample Group	<u>Property</u>	<u>Blank</u>	<u>Property</u>
Location Description	<u>MP-1330.5 133</u> <u>ML</u> <u>9/19/08</u>	<u>Blank</u>	<u>MP-1330.5</u> <u>ML</u> <u>9/19/08</u>
Category (circle)	<u>FS</u> FB (field blank) LB (lot blank) DB (prep-dry blank)	<u>FS</u> FB (field blank) LB (lot blank) DB (prep-dry blank)	<u>FS</u> FB (field blank) LB (lot blank) DB (prep-dry blank)
Matrix Type (circle)	Indoor <u>Outdoor</u> NA	Indoor <u>Outdoor</u> NA	Indoor <u>Outdoor</u> NA
Filter Diameter (circle)	<u>25mm</u> 37mm	<u>25mm</u> 37mm	<u>25mm</u> 37mm
Pore Size (circle)	<u>TEM- .45</u> <u>PCM- 0.8</u>	<u>TEM- .45</u> <u>PCM- 0.8</u>	<u>TEM- .45</u> <u>PCM- 0.8</u>
GPS Status (circle)	<u>Collected</u> Previously Collected Not Collected-no signal (3 attempts) Not Collected-not required for sample	<u>Collected</u> Previously Collected Not Collected-no signal (3 attempts) <u>Not Collected- not required for sample</u>	<u>Collected</u> Previously Collected Not Collected-no signal (3 attempts) Not Collected- not required for sample
GPS File (fill in or circle)	Filename: <u>BNSF-ROW</u> NA	Filename: <u>NA</u>	Filename: <u>BNSF-ROW</u> NA
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	<u>Rotometer</u> DryCal NA	<u>Rotometer</u> DryCal NA
Pump ID Number	<u>6401</u>		<u>8369</u>
Flow Meter ID No.	<u>PFKS-1</u>		<u>PFKS-1</u>
Start Date	<u>9/19/08</u>		<u>9/19/08</u>
Start Time	<u>0729</u>		<u>0729</u>
Start Flow (L/min)	<u>7.6</u>		<u>7.6</u>
Stop Date	<u>9/19/08</u>		<u>9/19/08</u>
Stop Time	<u>1147</u>		<u>1148</u>
Stop Flow (L/min)	<u>7.6</u>		<u>7.6</u>
Pump fault? (circle)	<u>No</u> Yes NA	No Yes NA	<u>No</u> Yes NA
MET Station onsite? (circle)	No <u>Yes</u> NA	No Yes NA	No <u>Yes</u> NA
Sample Type (circle)	Pre Post Clear 2 <sup>nd</sup> Clear 3 <sup>rd</sup> Clear <u>NA</u>	Pre Post Clear 2 <sup>nd</sup> Clear 3 <sup>rd</sup> Clear NA	Pre Post Clear 2 <sup>nd</sup> Clear 3 <sup>rd</sup> Clear <u>NA</u>
Field Comments			
Cassette Lot Number: <u>719817064</u>			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO): _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____

For Field Team Completion (Provide Initials)

Completed by: MLQC by: DW



**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No. 2 Page No. 13 Sampling Date: 9/22/08  
 Address: DNSF-Row Owner/Tenant: DNSF  
 Business Name: NA  
 Land Use: Residential School Commercial Mining Roadway Other (Row)  
 Sampling Team: CDM Other EMR Names: Math Lenz  
 Person Sampled/Co. Name: Eric Paulack/DNSF SSN: 0145 Task: Laborer

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00029</b>		
Location ID	AD-005568		
Sample Group	Property		
Location Description	MP 1329 1328 1329.8 ML 7/22/08		
Category (circle)	<input checked="" type="radio"/> FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)	FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)	FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)
Matrix Type (circle)	Indoor <input checked="" type="radio"/> Outdoor	Indoor <input type="radio"/> Outdoor	Indoor <input type="radio"/> Outdoor
Filter Diameter (circle)	<input checked="" type="radio"/> 25mm <input type="radio"/> 37mm	25mm <input type="radio"/> 37mm	25mm <input type="radio"/> 37mm
Pore Size (circle)	TEM-45 <input checked="" type="radio"/> PCM-0.8	TEM-45 <input type="radio"/> PCM-0.8	TEM-45 <input type="radio"/> PCM-0.8
Flow Meter Type (circle)	<input checked="" type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	Rotometer <input checked="" type="radio"/> DryCal <input type="radio"/> NA	Rotometer <input type="radio"/> DryCal <input type="radio"/> NA
Pump ID Number	4099		
Flow Meter ID No.	UFB-65		
Start Date	9/22/08		
Start Time	0629		
Start Flow (L/min)	2.8		
Stop Date	9/22/08		
Stop Time	1318		
Stop Flow (L/min)	2.8		
Pump fault? (circle)	<input checked="" type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA
MET Station onsite?	No <input checked="" type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA
Sample Type	TWA <input type="radio"/> EXC <input checked="" type="radio"/> NA	TWA <input type="radio"/> EXC <input type="radio"/> NA	TWA <input type="radio"/> EXC <input type="radio"/> NA
Field Comments			
Cassette Lot Number: 7198170164			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO)	Volpe: Entered Validated	Volpe: Entered Validated	Volpe: Entered Validated

For Field Team Completion  
(Provide Initials)

Completed by ML

QC by DW



## LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR

Field Logbook No. 2 Page No. 13 Sampling Date 9/22/08  
 Address BNSF ROW Owner/Tenant BNSF  
 Business Name NA  
 Land Use: Residential School Commercial Mining Roadway Other (ROW)  
 Sampling Team: CDM Other ENR Names Mark Lenz  
 Person Sampled/Co. Name Victor Buchmeier / BNSF SSN 2767 Task Crib operator

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00030</b>		
Location ID	AD-005568		
Sample Group	Property		
Location Description	MP 1329 1328 1329.8 ML 9/22/08		
Category (circle)	<u>FS</u> FB (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)
Matrix Type (circle)	Indoor <u>Outdoor</u>	Indoor Outdoor	Indoor Outdoor
Filter Diameter (circle)	<u>25mm</u> 37mm	25mm 37mm	25mm 37mm
Pore Size (circle)	TEM-45 <u>PCM-0.8</u>	TEM-45 PCM-0.8	TEM-45 PCM-0.8
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number	4098		
Flow Meter ID No.	UFB-65		
Start Date	9/22/08		
Start Time	0629		
Start Flow (L/min)	2.8		
Stop Date	9/22/08		
Stop Time	1318		
Stop Flow (L/min)	2.8		
Pump fault? (circle)	<u>No</u> Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No <u>Yes</u> NA	No Yes NA	No Yes NA
Sample Type	TWA EXC <u>NA</u>	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number: <u>7198170164</u>			
Archive Blank (circle): Yes No	Yes No	Yes No	Yes No
Volpe:			
Entered (LFO)	Entered Validated	Entered Validated	Entered Validated

For Field Team Completion  
(Provide Initials)

Completed by MLQC by DW



## LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR STATIONARY AIR

Field Logbook No: 2 Page No: 13/14 Sampling Date: 9/22/08  
 Address: BNSF ROW Owner/Tenant: BNSF  
 Business Name: NA

Land Use: Residential School Commercial Mining Roadway Other (ROW)  
 Sampling Team: CDM Other EMR Names: MATT LEHZE, JOHN STARR

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<u>BA- 00034</u>	<u>BA- 00035</u>	<u>BA- 00036</u>
Location ID	<u>SP- 138450</u>	<u>SP- 138451</u>	<u>Blank</u>
Sample Group	<u>Property</u>	<u>Property</u>	<u>Property</u>
Location Description	<u>MP 1329 1329.8</u> <u>1328 ML 9/22/08</u>	<u>MP 1329 1329.8</u> <u>1328 ML 9/22/08</u>	<u>Blank</u>
Category (circle)	<u>FS</u> FB-(field blank) LB-(lot blank) DB-(prep-dry blank)	<u>FS</u> FB-(field blank) LB-(lot blank) DB-(prep-dry blank)	<u>FS</u> FB-(field blank) LB-(lot blank) DB-(prep-dry blank)
Matrix Type (circle)	Indoor <u>Outdoor</u> NA	Indoor <u>Outdoor</u> NA	Indoor <u>Outdoor</u> NA
Filter Diameter (circle)	<u>25mm</u> 37mm	<u>25mm</u> 37mm	<u>25mm</u> 37mm
Pore Size (circle)	<u>TEM- 45</u> <u>PCM- 0.8</u>	<u>TEM- 45</u> <u>PCM- 0.8</u>	<u>TEM- 45</u> <u>PCM- 0.8</u>
GPS Status (circle)	<u>Collected</u> Previously Collected Not Collected-no signal (3 attempts) Not Collected-not required for sample	<u>Collected</u> Previously Collected Not Collected-no signal (3 attempts) Not Collected- not required for sample	<u>Collected</u> Previously Collected Not Collected-no signal (3 attempts) Not Collected- not required for sample
GPS File (fill in or circle)	Filename: <u>BNSF-ROW</u> NA	Filename: <u>BNSF-ROW</u> NA	Filename: <u>NA</u>
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	<u>Rotometer</u> DryCal NA	<u>Rotometer</u> DryCal NA
Pump ID Number	<u>6401</u>	<u>8369</u>	
Flow Meter ID No.	<u>PFK5-1</u>	<u>PFK5-1</u>	
Start Date	<u>9/22/08</u>	<u>9/22/08</u>	
Start Time	<u>1051</u>	<u>1051</u>	
Start Flow (L/min)	<u>7.6</u>	<u>7.6</u>	
Stop Date	<u>9/22/08</u>	<u>9/22/08</u>	
Stop Time	<u>1437</u>	<u>1437</u>	
Stop Flow (L/min)	<u>7.6</u>	<u>7.6</u>	
Pump fault? (circle)	<u>No</u> Yes NA	<u>No</u> Yes NA	No Yes NA
MET Station onsite? (circle)	No <u>Yes</u> NA	No <u>Yes</u> NA	No <u>Yes</u> NA
Sample Type (circle)	Pre Post Clear <u>2<sup>nd</sup> Clear 3<sup>rd</sup> Clear NA</u>	Pre Post Clear <u>2<sup>nd</sup> Clear 3<sup>rd</sup> Clear NA</u>	Pre Post Clear <u>2<sup>nd</sup> Clear 3<sup>rd</sup> Clear NA</u>
Field Comments			
Cassette Lot Number: <u>7198170164</u>			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO):	Volpe: Entered Validated	Volpe: Entered Validated	Volpe: Entered Validated

For Field Team Completion (Provide Initials)

Completed by: MLQC by: DW

## LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR

Field Logbook No. 2 Page No. 16 Sampling Date 9/23/08  
 Address: BNSF ROW Owner/Tenant: BNSF  
 Business Name: NA  
 Land Use: Residential ☐ School ☐ Commercial ☐ Mining ☐ Roadway ☒ Other (ROW)  
 Sampling Team: CDM ☐ Other ☒ EMR Names: Math  
 Person Sampled/Co. Name: Math Stashick / BNSF SSN: 7132 Task: Laborer

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00037</b>		
Location ID	<b>AD-005568</b>		
Sample Group	<b>Property</b>		
Location Description	<b>MP-1337</b>		
Category (circle)	<input checked="" type="radio"/> FS FB (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)
Matrix Type (circle)	Indoor <input type="radio"/> Outdoor <input checked="" type="radio"/>	Indoor <input type="radio"/> Outdoor <input type="radio"/>	Indoor <input type="radio"/> Outdoor <input type="radio"/>
Filter Diameter (circle)	<input checked="" type="radio"/> 25mm <input type="radio"/> 37mm	25mm <input type="radio"/> 37mm	25mm <input type="radio"/> 37mm
Pore Size (circle)	TEM-45 <input type="radio"/> PCM-0.8 <input checked="" type="radio"/>	TEM-45 <input type="radio"/> PCM-0.8 <input type="radio"/>	TEM-45 <input type="radio"/> PCM-0.8 <input type="radio"/>
Flow Meter Type (circle)	<input checked="" type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	Rotometer <input type="radio"/> DryCal <input type="radio"/> NA
Pump ID Number	<b>40</b>		
Flow Meter ID No.	<b>VEB-65</b>		
Start Date	<b>9/23/08</b>		
Start Time	<b>0640</b>		
Start Flow (L/min)	<b>0640 2.4</b>		
Stop Date	<b>9/23/08</b>		
Stop Time	<b>1148</b>		
Stop Flow (L/min)	<b>2.4</b>		
Pump fault? (circle)	<input checked="" type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA	No <input type="radio"/> Yes <input type="radio"/> NA
MET Station onsite?	No <input type="radio"/> Yes <input checked="" type="radio"/> NA <input type="radio"/>	No <input type="radio"/> Yes <input type="radio"/> NA <input type="radio"/>	No <input type="radio"/> Yes <input type="radio"/> NA <input type="radio"/>
Sample Type	TWA <input type="radio"/> EXC <input checked="" type="radio"/> NA <input type="radio"/>	TWA <input type="radio"/> EXC <input type="radio"/> NA <input type="radio"/>	TWA <input type="radio"/> EXC <input type="radio"/> NA <input type="radio"/>
Field Comments			
Cassette Lot Number: <b>7198170164</b>			
Archive Blank (circle): Yes No	Yes <input type="radio"/> No <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/>
Volpe: Entered Validated	Entered <input type="checkbox"/> Validated <input type="checkbox"/>	Entered <input type="checkbox"/> Validated <input type="checkbox"/>	Entered <input type="checkbox"/> Validated <input type="checkbox"/>

For Field Team Completion  
(Provide Initials)

Completed by ML

QC by DW



## LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR

Field Logbook No. 2 Page No. 16 Sampling Date 9/23/08  
 Address BNSF ROW Owner/Tenant BNSF  
 Business Name NA  
 Land Use: Residential ☐ School ☐ Commercial ☐ Mining ☐ Roadway ☒ (Other Row)  
 Sampling Team: CDM ☒ Other EMR Names: Mitch Herz  
 Person Sampled/Co Name: Dale Johnson / BNSF SSN: 5315 Task: crit operator

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00038</b>		
Location ID	<u>AD-005568</u>		
Sample Group	<u>Property</u>		
Location Description	<u>MP-1337</u>		
Category (circle)	<input checked="" type="radio"/> FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)	<input type="radio"/> FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)	<input type="radio"/> FS <input type="radio"/> FB (field blank) <input type="radio"/> LB (lot blank)
Matrix Type (circle)	Indoor <input type="radio"/> Outdoor <input checked="" type="radio"/>	Indoor <input type="radio"/> Outdoor <input type="radio"/>	Indoor <input type="radio"/> Outdoor <input type="radio"/>
Filter Diameter (circle)	<input checked="" type="radio"/> 25mm <input type="radio"/> 37mm	<input type="radio"/> 25mm <input type="radio"/> 37mm	<input type="radio"/> 25mm <input type="radio"/> 37mm
Pore Size (circle)	TEM-45 <input type="radio"/> PCM-0.8 <input checked="" type="radio"/>	TEM-45 <input type="radio"/> PCM-0.8 <input type="radio"/>	TEM-45 <input type="radio"/> PCM-0.8 <input type="radio"/>
Flow Meter Type (circle)	<input checked="" type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	<input type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA	<input type="radio"/> Rotometer <input type="radio"/> DryCal <input type="radio"/> NA
Pump ID Number	<u>4099</u>		
Flow Meter ID No	<u>UFB-65</u>		
Start Date	<u>9/23/08</u>		
Start Time	<u>0631</u>		
Start Flow (L/min)	<u>2.8</u>		
Stop Date	<u>9/23/08</u>		
Stop Time	<u>1149</u>		
Stop Flow (L/min)	<u>2.8</u>		
Pump fault? (circle)	<input checked="" type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA	<input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA	<input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA
ET Station onsite?	<input type="radio"/> No <input checked="" type="radio"/> Yes <input type="radio"/> NA	<input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA	<input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> NA
Sample Type	TWA <input type="radio"/> EXC <input checked="" type="radio"/> NA	TWA <input type="radio"/> EXC <input type="radio"/> NA	TWA <input type="radio"/> EXC <input type="radio"/> NA
Field Comments			
Cassette Lot Number <u>7118170164</u>			
Archive Blank (circle)	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No
Volpe			
Entered (LFO)	<input checked="" type="radio"/> Entered <input type="radio"/> Validated	<input type="radio"/> Entered <input type="radio"/> Validated	<input type="radio"/> Entered <input type="radio"/> Validated

For Field Team Completion  
(Provide Initials)

Completed by ML

QC by DW



**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No. 2 Page No. 16 Sampling Date: 9/23/08  
 Address: BNSF-ROW Owner/Tenant: BNSF  
 Business Name: NA

Land Use: Residential School Commercial Mining Roadway Other (Row)

Sampling Team: CDM Other EMR Names: Mathew

Person Sampled/Co. Name: Mathew / EMR SSN: 2806 Task: onlooker/responder

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00039</b>		
Location ID	<u>AD-005568</u>		
Sample Group	<u>Property</u>		
Location Description	<u>MP-1337</u>		
Category (circle)	<u>FS</u> FB (field blank) LB (lot blank)	<u>FS</u> FB (field blank) LB (lot blank)	<u>FS</u> FB (field blank) LB (lot blank)
Matrix Type (circle)	Indoor <u>Outdoor</u>	Indoor <u>Outdoor</u>	Indoor Outdoor
Filter Diameter (circle)	<u>25mm</u> 37mm	25mm <u>37mm</u>	25mm 37mm
Pore Size (circle)	TEM- 45 <u>PCM-0.8</u>	TEM- 45 PCM-0.8	TEM- 45 PCM-0.8
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number	<u>4100</u>		
Flow Meter ID No.	<u>VFB-6.5</u>		
Start Date	<u>9/23/08</u>		
Start Time	<u>0653</u>		
Start Flow (L/min)	<u>2.8</u>		
Stop Date	<u>9/23/08</u>		
Stop Time	<u>1150</u>		
Stop Flow (L/min)	<u>2.7</u>		
Pump fault? (circle)	<u>No</u> Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No <u>Yes</u> NA	No Yes NA	No Yes NA
Sample Type	TWA EXC <u>NA</u>	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number: <u>7198170164</u>			
Archive Blank (circle): Yes No	Yes No	Yes No	Yes No
Volpe:			
Entered (LFO)	Entered Validated	Entered Validated	Entered Validated

For Field Team Completion  
(Provide Initials)

Completed by MC

QC by DW



**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No: 2 Page No: 17 Sampling Date: 9/24/08  
 Address: BNSF-Row Owner Tenant: BNSF  
 Business Name: NA  
 Land Use: Residential School Commercial Mining Roadway Other (Row)  
 Sampling Team: CDM Other EMR Names: Matt Lenz  
 Person Sampled/Co. Name: Matt Stashick / BNSF SSN: 7132 Task: Laborer

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<u>ML</u> <u>9/24/08</u> <b>BA- 00047</b>		
Location ID	<u>AD-005568</u>		
Sample Group	<u>Property</u>		
Location Description	<u>MP-1339.5</u>		
Category (circle)	<u>FS</u> FB-(field blank) LB-(lot blank)	FS FB-(field blank) LB-(lot blank)	FS FB-(field blank) LB-(lot blank)
Matrix Type (circle)	Indoor <u>Outdoor</u>	Indoor Outdoor	Indoor Outdoor
Filter Diameter (circle)	<u>25mm</u> 37mm	25mm 37mm	25mm 37mm
Pore Size (circle)	TEM- .45 <u>PCM- 0.8</u>	TEM- .45 PCM- 0.8	TEM- .45 PCM- 0.8
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number	<u>4095</u>		
Flow Meter ID No.	<u>JFB-65</u>		
Start Date	<u>9/24/08</u>		
Start Time	<u>0617</u>		
Start Flow (L/min)	<u>2.8</u>		
Stop Date	<u>9/24/08</u>		
Stop Time	<u>ML</u> <u>9/24/08</u> <u>1309</u>		
Stop Flow (L/min)	<u>2.7</u> <u>2.8</u>		
Pump fault? (circle)	<u>No</u> Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No <u>Yes</u> NA	No Yes NA	No Yes NA
Sample Type	TWA EXC <u>NA</u>	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number: <u>7198170164</u>			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO) _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____

 For Field Team Completion  
 (Provide Initials)
Completed by ML

QC by

DW

**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No: 2 Page No: 19 Sampling Date: 9/24/08  
 Address: BNSF-Row Owner/Tenant: BNSF  
 Business Name: NA  
 Land Use: Residential School Commercial Mining Roadway (Other) ROW  
 Sampling Team: CDM (Other) EMR Names: Matt Lenz  
 Person Sampled/Co. Name: Karl Harms / BNSF SSN: 195 Task: Declipper machine operate

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID <i>ML 9/24/08</i>	<b>BA- 00048</b>		
Location ID	AD-005568		
Sample Group	Property		
Location Description	MP-1339.5		
Category (circle)	<u>(FS)</u> FB-(field blank) LB-(lot blank)	FS FB-(field blank) LB-(lot blank)	FS FB-(field blank) LB-(lot blank)
Matrix Type (circle)	Indoor <u>Outdoor</u>	Indoor Outdoor	Indoor Outdoor
Filter Diameter (circle)	<u>25mm</u> 37mm	25mm 37mm	25mm 37mm
Pore Size (circle)	TEM- .45 <u>PCM- 0.8</u>	TEM- .45 PCM- 0.8	TEM- .45 PCM- 0.8
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number	4091		
Flow Meter ID No.	UFB-65		
Start Date	9/24/08		
Start Time	0619		
Start Flow (L/min)	2.8		
Stop Date	9/24/08		
Stop Time <i>ML 9/24/08</i>	<del>1359</del> 1315		
Stop Flow (L/min)	2.8		
Pump fault? (circle)	<u>(No)</u> Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No <u>Yes</u> NA	No Yes NA	No Yes NA
Sample Type	TWA EXC <u>NA</u>	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number: <u>7198170164</u>			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO) _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____

For Field Team Completion  
(Provide Initials)

Completed by ML

QC by DW

## LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR STATIONARY AIR

Field Logbook No: 2 Page No: 20 Sampling Date: 9/24/08  
 Address: BNSF ROW Owner/Tenant: BNSF  
 Business Name: NA

Land Use: Residential School Commercial Mining Roadway Other (ROW)  
 Sampling Team: CDM Other EMR Names: John Starr

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<u>BA- 00055</u>	<u>BA- 00056</u>	<u>BA- 00057</u>
Location ID	<u>SP- 138459</u>	<u>AD-005568</u>	<u>AD-005568</u>
Sample Group	<u>Property</u>	<u>Blank</u>	<u>Blank</u>
Location Description	<u>MP-1339.5</u>	<u>MP-1339.5</u>	<u>MP-1339.5</u>
Category (circle)	<u>FS</u> FB-(field blank) LB-(lot blank) DB-(prep-dry blank)	<u>FS</u> <u>FB-(field blank)</u> LB-(lot blank) DB-(prep-dry blank)	<u>FS</u> <u>FB-(field blank)</u> LB-(lot blank) DB-(prep-dry blank)
Matrix Type (circle)	Indoor <u>Outdoor</u> NA	Indoor <u>Outdoor</u> NA	Indoor <u>Outdoor</u> <u>NA</u>
Filter Diameter (circle)	<u>25mm</u> 37mm	<u>25mm</u> 37mm	<u>25mm</u> 37mm
Pore Size (circle)	<u>TEM- .45</u> <u>PCM- 0.8</u>	<u>TEM- .45</u> <u>PCM- 0.8</u>	<u>TEM- .45</u> <u>PCM- 0.8</u>
GPS Status (circle)	<u>Collected</u> Previously Collected Not Collected-no signal (3 attempts) Not Collected-not required for sample	<u>Collected</u> Previously Collected Not Collected-no signal (3 attempts) Not Collected- not required for sample	<u>Collected</u> Previously Collected Not Collected-no signal (3 attempts) Not Collected- not required for sample
GPS File (fill in or circle)	Filename: <u>BNSF- ROW</u> NA	Filename: <u>NA</u>	Filename: <u>NA</u>
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	<u>Rotometer</u> DryCal NA	<u>Rotometer</u> DryCal NA
Pump ID Number	<u>8369</u>		
Flow Meter ID No.	<u>DFKS-1</u>		
Start Date	<u>9/24/08</u>		
Start Time	<u>0911</u>	<u>ML</u>	<u>ML</u>
Start Flow (L/min)	<u>7.6</u>	<u>9/24/08</u>	<u>7/24/08</u>
Stop Date	<u>9/24/08</u>		
Stop Time	<u>1246</u>		
Stop Flow (L/min)	<u>7.6</u>		
Pump fault? (circle)	<u>No</u> Yes NA	No Yes NA	No Yes NA
MET Station onsite? (circle)	No <u>Yes</u> NA	No Yes NA	No Yes NA
Sample Type (circle)	Pre Post Clear <u>2<sup>nd</sup> Clear</u> <u>3<sup>rd</sup> Clear</u> <u>NA</u>	Pre Post Clear <u>2<sup>nd</sup> Clear</u> <u>3<sup>rd</sup> Clear</u> NA	Pre Post Clear <u>2<sup>nd</sup> Clear</u> <u>3<sup>rd</sup> Clear</u> NA
Field Comments			
Cassette Lot Number: <u>7198170164</u>			
Entered (LFO): _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____	Volpe: Entered _____ Validated _____

For Field Team Completion (Provide Initials)

Completed by: MLQC by: DW

## LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR

Field Logbook No: 2 Page No: 21 Sampling Date: 9/25/08  
 Address: BNSF ROW Owner/Tenant: BNSF  
 Business Name: NA  
 Land Use: Residential School Commercial Mining Roadway Other (ROW)  
 Sampling Team: CDM Other EMR Names: Matt Lenz  
 Person Sampled/Co. Name: Eric Pankuk / BNSF SSN: 0145 Task: Laborer

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<u>ML</u> <u>9/25/08</u> <b>BA- 00058</b>		
Location ID	<u>AD-005568</u>		
Sample Group	<u>Property</u>		
Location Description	<u>MP-1341</u>		
Category (circle)	<u>FS</u> FS (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)
Matrix Type (circle)	Indoor <u>Outdoor</u>	Indoor Outdoor	Indoor Outdoor
Filter Diameter (circle)	<u>25mm</u> 37mm	25mm 37mm	25mm 37mm
Pore Size (circle)	TEM-45 <u>PCM-0.8</u>	TEM-45 PCM-0.8	TEM-45 PCM-0.8
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number	<u>4091</u>		
Flow Meter ID No.	<u>UFB-65</u>		
Start Date	<u>9/25/08</u>		
Start Time	<u>0623</u>		
Start Flow (L/min)	<u>2.8</u>		
Stop Date	<u>9/25/08</u>		
Stop Time	<u>0925</u>		
Stop Flow (L/min)	<u>2.8</u>		
Pump fault? (circle)	<u>No</u> Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No <u>Yes</u> NA	No Yes NA	No Yes NA
Sample Type	TWA EXC <u>NA</u>	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number: <u>7198170164</u>			
Archive Blank (circle): Yes No	Yes No	Yes No	Yes No
Volpe:			
Entered (LFO)	Entered Validated	Entered Validated	Entered Validated

For Field Team Completion  
(Provide Initials)

Completed by

ML

QC by

DW



**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No. 2 Page No. 21 Sampling Date: 9/25/08  
 Address: BNSF-ROW Owner/Tenant: BNSF  
 Business Name: NA

Land Use: Residential School Commercial Mining Roadway Other (ROW)

Sampling Team: CDM Other EMR Names: Matt Lenz

Person Sampled/Co. Name: Dryce Vandenberg / BNSF SSN: 6225 Task: Scrap crane operator

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00059</b>		
Location ID	<b>AD-005568</b>		
Sample Group	<b>Property</b>		
Location Description	<b>HP-1341</b>		
Category (circle)	<u>FS</u> FB (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)
Matrix Type (circle)	Indoor <u>Outdoor</u>	Indoor Outdoor	Indoor Outdoor
Filter Diameter (circle)	<u>25mm</u> 37mm	25mm 37mm	25mm 37mm
Pore Size (circle)	TEM- 45 <u>PCM- 0.8</u>	TEM- 45 PCM- 0.8	TEM- 45 PCM- 0.8
Flow Meter Type (circle)	<u>Rotometer</u> DryCal NA	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number	<b>4095</b>		
Flow Meter ID No.	<b>UFB-65</b>		
Start Date	<b>9/25/08</b>		
Start Time	<b>0625</b>		
Start Flow (L/min)	<b>2.8</b>		
Stop Date	<b>9/25/08</b>		
Stop Time	<b>0924</b>		
Stop Flow (L/min)	<b>2.8</b>		
Pump fault? (circle)	<u>No</u> Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No <u>Yes</u> NA	No Yes NA	No Yes NA
Sample Type	TWA EXC <u>NA</u>	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number: <b>719817064</b>			
Archive Blank (circle): Yes No	Yes No	Yes No	Yes No
Volpe:			
Entered (LFO) _____	Entered _____ Validated _____	Entered _____ Validated _____	Entered _____ Validated _____

For Field Team Completion  
(Provide Initials)

Completed by ML

QC by DW



**LIBBY FIELD SAMPLE DATA SHEET (FSDS) FOR PERSONAL AIR**

Field Logbook No: 2 Page No: 23 Sampling Date: 9/25/08  
 Address: BNSF-Row Owner/Tenant: BNSF  
 Business Name: NA  
 Land Use: Residential School Commercial Mining Roadway Other (Row)  
 Sampling Team: CDM Other EMR Names: MLL  
 Person Sampled/Co. Name: 1 SSN:                      Task:                     

Data Item	Cassette 1	Cassette 2	Cassette 3
Index ID	<b>BA- 00069</b>		
Location ID	<u>AD-005568</u>		
Sample Group	<u>Blank</u>		
Location Description	<u>Blank</u>		
Category (circle)	FS <u>FB</u> (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)	FS FB (field blank) LB (lot blank)
Matrix Type (circle)	Indoor <u>Outdoor</u>	Indoor Outdoor	Indoor Outdoor
Filter Diameter (circle)	<u>25mm</u> 37mm	25mm 37mm	25mm 37mm
Pore Size (circle)	TEM- 45 <u>PCM- 0.8</u>	TEM- 45 PCM- 0.8	TEM- 45 PCM- 0.8
Flow Meter Type (circle)	Rotometer DryCal <u>NA</u>	Rotometer DryCal NA	Rotometer DryCal NA
Pump ID Number			
Flow Meter ID No.			
Start Date			
Start Time			
Start Flow (L/min)			
Stop Date			
Stop Time			
Stop Flow (L/min)			
Pump fault? (circle)	No Yes NA	No Yes NA	No Yes NA
MET Station onsite?	No Yes NA	No Yes NA	No Yes NA
Sample Type	TWA EXC NA	TWA EXC NA	TWA EXC NA
Field Comments			
Cassette Lot Number: <u>714817064</u>			
	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No	Archive Blank (circle): Yes No
Entered (LFO) <u>                    </u>	Volpe: Entered Validated	Volpe: Entered Validated	Volpe: Entered Validated

For Field Team Completion  
(Provide Initials)

Completed by ML

QC by DW



## APPENDIX D

### FIELD CHANGE ORDERS

### Field Change Order (FCO) #17-1

**DATE:** Wednesday, September 17, 2008

**ADDRESS:** BNSF ROW

**PROJECT NAME:** Libby Asbestos Project

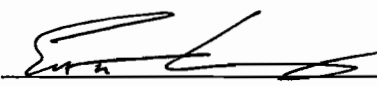
#### DESCRIPTION OF CHANGE AND RATIONALE

The flow rates on ABS monitors could not reach 5 L/min (most could reach 2.8 L/min) – had to reassess using higher sensitivity (0.0024 cc-1), instead of original target sensitivity of 0.001 cc-1).

The reduced flow rates led to extending the sampling period from 2 and 4 hr/event to 6 and 8 hr/event.

#### SIGNATURE APPROVALS

EPA MANAGEMENT: \_\_\_\_\_ DATE: \_\_\_\_\_

EMR MANAGEMENT:  \_\_\_\_\_ DATE: 9/17/08



### Field Change Order (FCO) #17- 3

**DATE:** Wednesday, September 17, 2008

**ADDRESS:** BNSF ROW

**PROJECT NAME:** Libby Asbestos Project

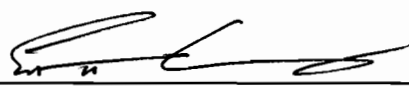
#### DESCRIPTION OF CHANGE AND RATIONALE

The SAP was written assuming that all train activity on both tracks (main and siding) would be halted during maintenance activities. However, Day 1 maintenance activity occurred on a track siding and after several hours into the maintenance activities, the main track opened to passing trains.

As a result, passing train activities were noted in the field logbook.

#### SIGNATURE APPROVALS

EPA MANAGEMENT: \_\_\_\_\_ DATE: \_\_\_\_\_

EMR MANAGEMENT:  \_\_\_\_\_ DATE: 9/17/08

## Field Change Order (FCO) #17- 6

**DATE:** Wednesday, September 17, 2008

**ADDRESS:** BNSF ROW

**PROJECT NAME:** Libby Asbestos Project


### DESCRIPTION OF CHANGE AND RATIONALE

Event duration for the worker is variable (up to 10 hr days) and not controlled by sampling design team. Sample team can only control turning on pumps in the morning (approximately 6:30 am) and picking pumps up at the end of the working day (late afternoon) – had to reassess flow rate as setting ABS worker pumps to 2.8 L/min for roughly 10 hour sampling event (6:30 am to 4:30 pm) yielded filter loading.

Reassessed flow rate for worker to avoid filter loading for next sampling event.

### SIGNATURE APPROVALS

EPA MANAGEMENT: \_\_\_\_\_ DATE: \_\_\_\_\_

EMR MANAGEMENT:  \_\_\_\_\_ DATE: 9/17/08

## Field Change Order (FCO) #18-2

**DATE:** Thursday, September 18, 2008

**ADDRESS:** BNSF ROW

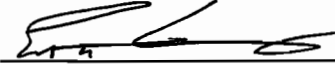
**PROJECT NAME:** Libby Asbestos Project

### DESCRIPTION OF CHANGE AND RATIONALE

Reassessed flow rate for worker to avoid filter loading for sampling event due to previous day's filter loading. Set flow rate from 2.8 L/min to 1.0 L/min to see if loading would still be an issue.

### SIGNATURE APPROVALS

EPA MANAGEMENT: \_\_\_\_\_ DATE: \_\_\_\_\_

EMR MANAGEMENT:  \_\_\_\_\_ DATE: 9/18/08

### Field Change Order (FCO) #18-3

**DATE:** Thursday, September 18, 2008

**ADDRESS:** BNSF ROW

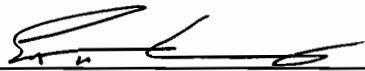
**PROJECT NAME:** Libby Asbestos Project

#### DESCRIPTION OF CHANGE AND RATIONALE

Note that sampling on Day 1 occurred in a very dry dusty location, with resulting filter loading on worker ABS samples; whereas, Day 2 sampling location was also dry, but significantly less dusty (probably due to minimal exposed soil, and no dirt access road alongside trackage).

#### SIGNATURE APPROVALS

EPA MANAGEMENT: \_\_\_\_\_ DATE: \_\_\_\_\_

EMR MANAGEMENT:  \_\_\_\_\_ DATE: 9/18/08



## Field Change Order (FCO) #19-1

**DATE:** Friday, September 19, 2008

**ADDRESS:** BNSF ROW


**PROJECT NAME:** Libby Asbestos Project

### DESCRIPTION OF CHANGE AND RATIONALE

Scheduled maintenance work was less than 1,000 feet in length. Therefore, worker ABS sampling period limited compared to Day 1 and Day 2 sampling. Modified sampling plan to suit shortened maintenance length and duration.

### SIGNATURE APPROVALS

EPA MANAGEMENT: \_\_\_\_\_ DATE: \_\_\_\_\_

EMR MANAGEMENT:  \_\_\_\_\_ DATE: 9/19/08

### Field Change Order (FCO) #22-1

**DATE:** Monday, September 22, 2008

**ADDRESS:** BNSF ROW

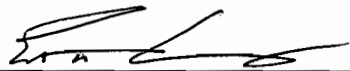
**PROJECT NAME:** Libby Asbestos Project

#### DESCRIPTION OF CHANGE AND RATIONALE

The SAP called for ABS sampling only during dry conditions, since it was based on EPA guidance. Sampling on this day event included light to heavy rain and was completed . Soil sampling, ABS and stationary air sampling was completed in otherwise normal fashion.

#### SIGNATURE APPROVALS

EPA MANAGEMENT: \_\_\_\_\_ DATE: \_\_\_\_\_

EMR MANAGEMENT:  \_\_\_\_\_ DATE: 9/22/08



## APPENDIX E

### WORKER AIR SAMPLE LABORATORIES REPORTS

**EMSL Analytical, Inc.**

107 Haddon Avenue

Westmont, New Jersey 08108

Phone: (856) 858-4800

Fax: (856) 858-9551



## LETTER OF TRANSMITTAL

To: <u>Scott Carney</u> <u>EMR, Inc.</u> <u>11 East Superior Street</u> <u>Suite 260</u> <u>Duluth, MN 55802</u> <u>Phone: 763-277-5200</u>	Date: <u>July 17, 2009</u> From: <u>Charles E. LaCerra</u> Re: <u>Libby, MT BNSF Work</u> <u>Mobile Lab Analytical Reports</u> <u>See Below</u>
--	---

**We are sending you:**      **× Attached**      **Under separate cover via**

<input type="checkbox"/> Solicitation	<input type="checkbox"/> Copy of Letter	<input type="checkbox"/> Invoice #'s See Below
<input type="checkbox"/> Subcontract	<input type="checkbox"/> As noted	<input type="checkbox"/> Other
<input type="checkbox"/> Laboratory Samples	<input checked="" type="checkbox"/> Analytical Reports	

**These are transmitted as indicated below:**

<input type="checkbox"/> Execute ___ Original(s)	<input type="checkbox"/> Review & Comment	<input type="checkbox"/> For Approval
<input type="checkbox"/> Return ___ Original(s)	<input type="checkbox"/> As Requested	<input type="checkbox"/> Respond as instructed
<input checked="" type="checkbox"/> For Your Information/File		<input type="checkbox"/> Other

**Remarks:**

Enclosed please find one (1) copy of the following mobile lab analytical reports for analysis for your review and use for the above referenced project:

270900045

Please feel free to contact me with any questions or if you require additional information

Copy to: \_\_\_\_\_

Signed: \_\_\_\_\_

*Charles LaCerra*



# INTERNAL CHAIN OF CUSTODY

4/14/2009 4:42:05 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984  
Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID EMRI78  
Customer PO:  
Received: 04/14/09 4:11 PM

EMSL Order: 270900045  
EMSL Proj ID: BNSF Libby, MT 2008  
Cust COC ID

Test: TEM ISO 10312 Matrix Air TAT: 10 Days Qty: 14

Acct Sts: Slsprsn: epodell

Logged: jwyattpescador Date: 4/14/2009

Sample Condition: ☒ Acceptable  
☐ Unacceptable

Comments

Initial Prep (Initials/Lab): EDMP Date: 4/15/09  
Filter Prep (Initials/Lab): EDMP Date: 4/15/09  
Grid Prep (Initials/Lab): EDMP Date: 4/15/09

For Special Projects Use Only:

QC Selection: Date:  
Date Package Review: KL Date: 7-15-09  
Date Package Mailed: DL Date: 7/17/09

## Special Instructions

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	\270900045-0001 A	BA-00001	(50mb), OL- Loose Debris in Cool	4/24/2009 4:11:00 PM
270900045	\270900045-0002 B	BA-00002	(25mb), OL- Loose Debris In Cool	4/24/2009 4:11:00 PM
270900045	\270900045-0003 C	BA-00011		4/24/2009 4:11:00 PM
270900045	\270900045-0004 D	BA-00012		4/24/2009 4:11:00 PM
270900045	\270900045-0005 E	BA-00021	(RS)	4/24/2009 4:11:00 PM
270900045	\270900045-0006 F	BA-00022		4/24/2009 4:11:00 PM
270900045	\270900045-0007 G	BA-00029		4/24/2009 4:11:00 PM
270900045	\270900045-0008 H	BA-00030		4/24/2009 4:11:00 PM

LB, RD, RS

2709-BNS-38 (A-G), (R)

EMSL Analytical, Inc., 107 West 4th Street, Libby, MT 59923

# INTERNAL CHAIN OF CUSTODY

4/14/2009 4:42:05 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984

Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID EMRI78

Customer PO:

Received: 04/14/09 4:11 PM

EMSL Order: 270900045

EMSL Proj ID: BNSF Libby, MT 2008

Cust COC ID

270900045	270900045-0009 <i>e</i> BA-00037 (25ml), DL-Loose Debris in Cool	4/24/2009 4:11:00 PM
270900045	270900045-0010 <i>j</i> BA-00038 (50ml), DL-Loose Debris in Cool	4/24/2009 4:11:00 PM
270900045	270900045-0011 <i>k</i> BA-00047 (R.D.)	4/24/2009 4:11:00 PM
270900045	270900045-0012 <i>l</i> BA-00048	4/24/2009 4:11:00 PM
270900045	270900045-0013 <i>m</i> BA-00058	4/24/2009 4:11:00 PM
270900045	270900045-0014 <i>n</i> BA-00059	4/24/2009 4:11:00 PM

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:23 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984  
Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78  
Customer PO:  
Received: 04/14/09 4:11 PM  
EMSL Order: 270900045  
EMSL Proj ID: BNSF Libby, MT 2008  
Cust COC ID

**Test:** TEM ISO 10312

**Matrix:** Air

**TAT:** 10 Days

**Qty:** 14

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0001	BA-00001		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>RMD</i>	Date:	4/16/09
Preliminary Data Sent to Special Projects:	<i>RKM</i>	Date:	4/17/09
Data Entry:	<i>de</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/24/09
Reported to Client:	<i>TP</i>	Date:	4/22/09

Micrographs:

	Micrograph Number	Type Diffraction or Morphology

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:23 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984

Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78

Customer PO:

Received: 04/14/09 4:11 PM

EMSL Order: 270900045

EMSL Proj ID: BNSF Libby, MT 2008

Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0002	BA-00002		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>RMV</i>	Date:	4/16/09
Preliminary Data Sent to Special Projects:	<i>RKm</i>	Date:	4/17/09
Data Entry:	<i>OL</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/21/09
Reported to Client:	<i>TP</i>	Date:	4/22/09

Micrographs:

Micrograph Number	Type Diffraction or Morphology



# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984

Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78

Customer PO:

Received: 04/14/09 4:11 PM

EMSL Order: 270900045

EMSL Proj ID: BNSF Libby, MT 2008

Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0003	BA-00011		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>RM</i>	Date:	4/16/09
Preliminary Data Sent to Special Projects:	<i>Rkm</i>	Date:	4/17/09
Data Entry:	<i>SL</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/24/09
Reported to Client:	<i>TP</i>	Date:	4/22/09

Micrographs:

	Micrograph Number	Type Diffraction or Morphology

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984  
Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78  
Customer PO:  
Received: 04/14/09 4:11 PM

EMSL Order: 270900045  
EMSL Proj ID: BNSF Libby, MT 2008  
Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0004	BA-00012		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>RM</i>	Date:	4/16/09
Preliminary Data Sent to Special Projects:	<i>RM</i>	Date:	4/17/09
Data Entry:	<i>SL</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/21/09
Reported to Client:	<i>TP</i>	Date:	4/22/09

Micrographs:

	Micrograph Number	Type Diffraction or Morphology

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984

Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78

Customer PO:

Received: 04/14/09 4:11 PM

EMSL Order: 270900045

EMSL Proj ID: BNSF Libby, MT 2008

Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0005	BA-00021		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>MS</i>	Date:	4/16/09
Preliminary Data Sent to Special Projects:	<i>RKm</i>	Date:	9/12/09
Data Entry:	<i>SL</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/24/09
Reported to Client:	<i>TP</i>	Date:	4/22/09

Micrographs:

Micrograph Number	Type Diffraction or Morphology

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984  
Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78  
Customer PO:  
Received: 04/14/09 4:11 PM

EMSL Order: 270900045  
EMSL Proj ID: BNSF Libby, MT 2008  
Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0006	BA-00022		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>PMJ</i>	Date:	4/17/09
Preliminary Data Sent to Special Projects:	<i>RKm</i>	Date:	4/17/09
Data Entry:	<i>el</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/24/09
Reported to Client:	<i>TP</i>	Date:	4/22/09

Micrographs:

	Micograph Number	Type Diffraction or Morphology



# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984  
Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78  
Customer PO:  
Received: 04/14/09 4:11 PM

EMSL Order: 270900045  
EMSL Proj ID: BNSF Libby, MT 2008  
Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0007	BA-00029		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>RMJ</i>	Date:	4/17/09
Preliminary Data Sent to Special Projects:	<i>Rkm</i>	Date:	4/17/09
Data Entry:	<i>OL</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/24/09
Reported to Client:	<i>TP</i>	Date:	4/22/09

Micrographs:

	Micograph Number	Type Diffraction or Morphology

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984  
Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMR178  
Customer PO:  
Received: 04/14/09 4:11 PM

EMSL Order: 270900045  
EMSL Proj ID: BNSF Libby, MT 2008  
Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0008	BA-00030		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>MSY</i>	Date:	4/17/09
Preliminary Data Sent to Special Projects:	<i>RKm</i>	Date:	4/17/09
Data Entry:	<i>cu</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TR</i>	Date:	4/24/09
Reported to Client:	<i>TR</i>	Date:	4/22/09

Micrographs:

	Micrograph Number	Type Diffraction or Morphology

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984

Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78

Customer PO:

Received: 04/14/09 4:11 PM

EMSL Order: 270900045

EMSL Proj ID: BNSF Libby, MT 2008

Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0009	BA-00037		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>pkj</i>	Date:	4/17/09
Preliminary Data Sent to Special Projects:	<i>Rkm</i>	Date:	4/17/09
Data Entry:	<i>ee</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/24/09
Reported to Client:	<i>TP</i>	Date:	4/22/09

Micrographs:

	Micrograph Number	Type Diffraction or Morphology

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984  
Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78  
Customer PO:  
Received: 04/14/09 4:11 PM

EMSL Order: 270900045  
EMSL Proj ID: BNSF Libby, MT 2008  
Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0010	BA-00038		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>pm</i>	Date:	4/17/09
Preliminary Data Sent to Special Projects:	<i>Rkm</i>	Date:	4/17/09
Data Entry:	<i>sl</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/21/09
Reported to Client:	<i>TP</i>	Date:	4/22/09

Micrographs:

	Micrograph Number	Type Diffraction or Morphology



# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984  
Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78  
Customer PO:  
Received: 04/14/09 4:11 PM

EMSL Order: 270900045  
EMSL Proj ID: BNSF Libby, MT 2008  
Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0011	BA-00047		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>PMY</i>	Date:	4/17/09
Preliminary Data Sent to Special Projects:	<i>RKm</i>	Date:	4/17/09
Data Entry:	<i>EL</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TR</i>	Date:	4/24/09
Reported to Client:	<i>TR</i>	Date:	4/22/09

Micrographs:

	Micrograph Number	Type Diffraction or Morphology

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984  
Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78  
Customer PO:  
Received: 04/14/09 4:11 PM

EMSL Order: 270900045  
EMSL Proj ID: BNSF Libby, MT 2008  
Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0012	BA-00048		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>RM</i>	Date:	4/17/09
Preliminary Data Sent to Special Projects:	<i>Rkm</i>	Date:	4/17/09
Data Entry:	<i>SL</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TR</i>	Date:	4/24/09
Reported to Client:	<i>TR</i>	Date:	4/22/09

Micrographs:

Micrograph Number	Type Diffraction or Morphology

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984

Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78

Customer PO:

Received: 04/14/09 4:11 PM

EMSL Order: 270900045

EMSL Proj ID: BNSF Libby, MT 2008

Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0013	BA-00058		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>RPV</i>	Date:	4/17/09
Preliminary Data Sent to Special Projects:	<i>R/cm</i>	Date:	4/12/09
Data Entry:	<i>ec</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/21/09
Reported to Client:	<i>TP</i>	Date:	4/22/09

Micrographs:

	Micrograph Number	Type Diffraction or Morphology

# INTERNAL SAMPLE CHAIN OF CUSTODY

4/14/2009 4:42:24 PM

Order ID: 270900045

Attn: Scott Carney  
EMR, Inc.  
11 East Superior Street  
Suite 260  
Duluth, MN 55802

Fax: (218) 625-2337 Phone: (218) 625-2332

Project: L14984

Samples collected 9/17, 18, 19, 22, 23, 24, 25/2008

Customer ID: EMRI78

Customer PO:

Received: 04/14/09 4:11 PM

EMSL Order: 270900045

EMSL Proj ID: BNSF Libby, MT 2008

Cust COC ID

Order ID	Lab Sample #	Cust. Sample #	Location	Due Date
270900045	270900045-0014	BA-00059		4/24/2009 4:11:00 PM

Comments:

ANALYZED:	<i>RM</i>	Date:	4/17/09
Preliminary Data Sent to Special Projects:	<i>RKm</i>	Date:	4/17/09
Data Entry:	<i>cu</i>	Date:	4/20/09
Structure Review:		Date:	
Data Validation:	<i>TP</i>	Date:	4/24/09
Reported to Client:	<i>TP</i>	Date:	4/24/09

Micrographs:

	Micrograph Number	Type Diffraction or Morphology



TEM Air  
(Circle One)

TEM Dust

PCM

# Indirect Preparation Record

EFA 360 (mm2)

INDIRECT PREPARATION RECORD

REVISION 1

FEBRUARY 9, 2009

		Indirect without ashing			Dilution Filtration						Indirect with Ashing			OK to Prep to Grid?
Prepped by:	Date:	Fraction of filter used	1st Resuspend Volume	Volume applied to filter	Volume of 1st Resuspend used	2nd Re-suspend Volume	Volume applied to filter	Volume of 2nd Re-suspend used	3rd Re-suspend Volume	Volume applied to filter	Fraction of filter ashed	Volume used to resuspend residue	Volume applied to 2nd filter	
Order ID	Sample #		mL	mL	mL	mL	mL	mL	mL	mL		mL	mL	Y/N
270900045	BA00001										1/2	100	10	
													15	
													25	
													50	Y
	BA00002										1/2	100	10	
													15	
													25	Y
													50	
	BA00037										1/2	100	10	
													15	
													25	Y
													50	
	BA00038										1/2	100	10	
													15	
													25	
													50	Y
	FilBlank										1/2	100	100	Y
	AshBlank											100	100	Y
	MB											100	100	Y

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Overloaded  
 EPA Sample Number BA-00001  
 QA Type Not QA  
 Lab Sample Number 270900045-0001  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 0  
 Number of Grid Openings (chrysotile) 0  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 1344 L  
 Sensitivity (amphibole) s/cc  
 Sensitivity (chrysotile) s/cc  
 Area Examined (amphibole) 0.000 mm2  
 Area Examined (chrysotile) 0.000 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024	39	50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK  
 Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00001-270900045-0001-ISO\_D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Overloaded

EPA Sample Number:	BA-00001
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	1344
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0001
Number of grids prepared	
Prepared by	
Preparation date	
EPA COC Number	L14984

Analyzed by	
Analysis date	
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	Yes
Counting rules	ISO (Air or Dust)
Grid storage location	
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
10	GOs required to reach target sensitivity
39	Maximum # of GOs
50	Maximum # of Structure
10	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

## COMMENTS

Overloaded

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00001\_270900045-0001\_ISO\_D.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00001
270900045-0001

Sample Type	Air
Count Rule	10312

Prep	Direct
QA Type	Not QA

## ERROR CHECK

OK - No errors found

Data Entry by:

L.Ramowski

QA by: T. Peters

Data Entry date:

4/20/2009

QA date: 4/21/2009

[illegible]



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00001  
 QA Type Not QA  
 Lab Sample Number 270900045-0001  
 Sample Type Air  
 Category Field  
 Prep Indirect  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 360.0 mm<sup>2</sup>  
 Indirect factor 2.50E-01  
 Number of Grid Openings (amphibole) 39  
 Number of Grid Openings (chrysotile) 39  
 Grid opening area 0.013 mm<sup>2</sup>  
 Volume (L) or Area (cm<sup>2</sup>) 1344 L  
 Sensitivity (amphibole) 2.11E-03 s/cc  
 Sensitivity (chrysotile) 2.11E-03 s/cc  
 Area Examined (amphibole) 0.507 mm<sup>2</sup>  
 Area Examined (chrysotile) 0.507 mm<sup>2</sup>

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK  
 Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00001\_270900045-0001\_ISO 04-16-09 I.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00001
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	1344
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0001
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/16/2009
Prep	Indirect
If sample type = air, is there loose material or debris in the bowl?	Yes
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, A
Archive filter(s) storage location	Westmont
Enter the appropriate data in the cells to the right to calculate the F-factor >>>>>	
F- factor	0.25
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
35	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
35	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

0.5	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
100	First resuspension volume or rinsate volume (mL)
50	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

0.25	F-factor
------	----------

Grid opening traverse direction:	V
----------------------------------	---

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00001\_270900045-0001\_ISO\_04-16-09\_l.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00001  
270900045-0001

Sample Type	Air
Count Rule	10312

Prep	Indirect
QA Type	Not QA

## ERROR CHECK

OK - No errors found

Data Entry by:	L.Ramowski
Data Entry date:	4/20/2009

QA by:	T. Peters
QA date:	4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]

[illegible]



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312****SAMPLE ID**

Status Overloaded  
 EPA Sample Number BA-00002  
 QA Type Not QA  
 Lab Sample Number 270900045-0002  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 0  
 Number of Grid Openings (chrysotile) 0  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 1333 L  
 Sensitivity (amphibole) s/cc  
 Sensitivity (chrysotile) s/cc  
 Area Examined (amphibole) 0.000 mm2  
 Area Examined (chrysotile) 0.000 mm2

**Recording  
Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping  
Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK  
 Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length &gt; 5 um, Width &gt;= 0.25 um, Aspect Ratio &gt;= 3:1

FILE NAME: BA-00002 270900045-0002 ISO D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Overloaded

EPA Sample Number:	BA-00002
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	1333
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0002
Number of grids prepared	
Prepared by	
Preparation date	
EPA COC Number	L14984

Analyzed by	
Analysis date	
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	Yes
Counting rules	ISO (Air or Dust)
Grid storage location	
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## COMMENTS

Overloaded

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
10	GOs required to reach target sensitivity
50	Maximum # of GOs
10	Maximum # of Structure
	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00002\_270900045-0002\_ISO\_D.xls

EPA SAMPLE ID:	BA-00002
LAB SAMPLE ID:	270900045-0002

Sample Type	Air
Count Rule	10312

Prep	Direct
QA Type	Not QA

### ERROR CHECK

OK - No errors found

Data Entry by:	L.Ramowski
Data Entry date:	4/20/2009

QA by:	T. Peters
QA date:	4/21/2009

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**
**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00002  
 QA Type Not QA  
 Lab Sample Number 270900045-0002  
 Sample Type Air  
 Category Field  
 Prep Indirect  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 360.0 mm<sup>2</sup>  
 Indirect factor 1.25E-01  
 Number of Grid Openings (amphibole) 39  
 Number of Grid Openings (chrysotile) 39  
 Grid opening area 0.013 mm<sup>2</sup>  
 Volume (L) or Area (cm<sup>2</sup>) 1333 L  
 Sensitivity (amphibole) 4.26E-03 s/cc  
 Sensitivity (chrysotile) 4.26E-03 s/cc  
 Area Examined (amphibole) 0.507 mm<sup>2</sup>  
 Area Examined (chrysotile) 0.507 mm<sup>2</sup>

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024	39	50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		≥ 5
C = Chrysotile	c		>.5	≥ 5
	d	≥.5 to < 5	≤.5	≥ 5
	e	5 to 10	≤.5	≥ 5
	f	>10	≤.5	≥ 5

PCME: Length &gt; 5 um, Width ≥ 0.25 um, Aspect Ratio ≥ 3:1

FILE NAME: BA-00002\_270900045-0002\_ISO\_04-16-09\_1.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00002
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	1333
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0002
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/16/2009
Prep	Indirect
If sample type = air, is there loose material or debris in the container?	Yes
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, B
Archive filter(s) storage location	Westmont
Enter the appropriate data in the cells to the right to calculate the F-factor >>>>>	
F- factor	0.125
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
70	GOs required to reach target sensitivity
39	Maximum # of GOs
50	Maximum # of Structure
39	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

0.5	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
100	First resuspension volume or rinsate volume (mL)
25	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

0.125 F-factor

Grid opening traverse direction: V

## COMMENTS



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00002\_270900045-0002\_ISO\_04-16-09\_l.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00002  
270900045-0002

Sample Type	Air
Count Rule	10312

Prep	Indirect
QA Type	Not QA

### ERROR CHECK

OK - No errors found

Data Entry by:	L.Ramowski
Data Entry date:	4/20/2009

QA by:	T. Peters
QA date:	4/21/2009

**Maximum # of Grid Openings Reached-Complete current GO then stop.**

[illegible]

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00011  
 QA Type Not QA  
 Lab Sample Number 270900045-0003  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm<sup>2</sup>  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 18  
 Number of Grid Openings (chrysotile) 18  
 Grid opening area 0.013 mm<sup>2</sup>  
 Volume (L) or Area (cm<sup>2</sup>) 706 L  
 Sensitivity (amphibole) 2.33E-03 s/cc  
 Sensitivity (chrysotile) 2.33E-03 s/cc  
 Area Examined (amphibole) 0.234 mm<sup>2</sup>  
 Area Examined (chrysotile) 0.234 mm<sup>2</sup>

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00011\_270900045-0003\_ISO\_04-16-09\_D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00011
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	706
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0003
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/16/2009
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, C
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
18	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
18	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

V

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00011\_270900045-0003 ISO 04-16-09 D.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00011  
270900045-0003

Sample Type  
Count Rule

Air  
10312

Prep  
QA Type

Direct
Not QA

## ERROR CHECK

OK - No errors found

Data Entry by:

L.Ramowski

QA by:

T. Peters

Data Entry date:

4/20/2009

QA date:

4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**
**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00012  
 QA Type Not QA  
 Lab Sample Number 270900045-0004  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 18  
 Number of Grid Openings (chrysotile) 18  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 687 L  
 Sensitivity (amphibole) 2.39E-03 s/cc  
 Sensitivity (chrysotile) 2.39E-03 s/cc  
 Area Examined (amphibole) 0.234 mm2  
 Area Examined (chrysotile) 0.234 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00012\_270900045-0004\_ISO\_04-16-09\_D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00012
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	687
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0004
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/16/2009
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, D
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
18	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
18	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

V

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00012\_270900045-0004\_ISO\_04-16-09\_D.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00012  
270900045-0004

Sample Type	Air
Count Rule	10312

Prep	Direct
QA Type	Not QA

### ERROR CHECK

OK - No errors found

Data Entry by:	L.Ramowski
Data Entry date:	4/20/2009

QA by:	T.Peters
QA date:	4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00021  
 QA Type Not QA  
 Lab Sample Number 270900045-0005  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 13  
 Number of Grid Openings (chrysotile) 13  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 988 L  
 Sensitivity (amphibole) 2.31E-03 s/cc  
 Sensitivity (chrysotile) 2.31E-03 s/cc  
 Area Examined (amphibole) 0.169 mm2  
 Area Examined (chrysotile) 0.169 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK  
 Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00021\_270900045-0005\_ISO\_04-16-09\_D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00021
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	988
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0005
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/16/2009
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, E
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
13	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
13	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:	V
----------------------------------	---

## COMMENTS



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00021\_270900045-0005\_ISO\_04-16-09\_D.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00021  
270900045-0005

Sample Type	Air
Count Rule	10312

Prep	Direct
QA Type	Not QA

### ERROR CHECK

OK - No errors found

Data Entry by: L.Ramowski

Data Entry date: 4/20/2009

QA by: T. Peters

QA date: 4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00022  
 QA Type Not QA  
 Lab Sample Number 270900045-0006  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 13  
 Number of Grid Openings (chrysotile) 13  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 1016 L  
 Sensitivity (amphibole) 2.24E-03 s/cc  
 Sensitivity (chrysotile) 2.24E-03 s/cc  
 Area Examined (amphibole) 0.169 mm2  
 Area Examined (chrysotile) 0.169 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK  
 Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00022\_270900045-0006\_ISO\_04-17-09\_D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00022
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	1016
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0006
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/17/2009
Prep	Direct
if sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, F
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
13	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
13	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:	V
----------------------------------	---

## COMMENTS

## BA-00022\_270900045-0006\_ISO\_04-17-09\_D.xls

BA-00022

270900045-0006

Air

10312

Direct

Not QA

OK - No errors found

L.Ramowski

4/20/2009

T.Peters

4/21/2009

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00029  
 QA Type Not QA  
 Lab Sample Number 270900045-0007  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 11  
 Number of Grid Openings (chrysotile) 11  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 1145 L  
 Sensitivity (amphibole) 2.35E-03 s/cc  
 Sensitivity (chrysotile) 2.35E-03 s/cc  
 Area Examined (amphibole) 0.143 mm2  
 Area Examined (chrysotile) 0.143 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1



FILE NAME: BA-00029\_270900045-0007\_ISO\_04-17-09\_D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00029
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	1145
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0007
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/17/2009
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, G
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
11	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
11	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

V

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00029\_270900045-0007\_ISO\_04-17-09\_D.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00029

270900045-0007

Sample Type	Air
Count Rule	103

Air

10312

Prep	Direct
QA Type	Not QA

Direct

Not QA

ERROR CHECK

OK - No errors found

Data Entry by: L.Ramowski

L. Ramowski

Data Entry date: 4/20/2009

4/20/2009

QA by: T. Peters

T. Peters

QA date: 4/21/2009

4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00030  
 QA Type Not QA  
 Lab Sample Number 270900045-0008  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 11  
 Number of Grid Openings (chrysotile) 11  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 1145 L  
 Sensitivity (amphibole) 2.35E-03 s/cc  
 Sensitivity (chrysotile) 2.35E-03 s/cc  
 Area Examined (amphibole) 0.143 mm2  
 Area Examined (chrysotile) 0.143 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00030\_270900045-0008\_ISO\_04-17-09\_D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00030
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	1145
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0008
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/17/2009
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, H
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
11	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
11	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

V

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00030\_270900045-0008\_ISO\_04-17-09\_D.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00030  
270900045-0008

Sample Type	Air
Count Rule	10312

Prep	Direct
QA Type	Not QA

### ERROR CHECK

OK - No errors found

Data Entry by: L.Ramowski

Data Entry date: 4/20/2009

QA by: T. Peters

QA date: 4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]





**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Overloaded  
 EPA Sample Number BA-00037  
 QA Type Not QA  
 Lab Sample Number 270900045-0009  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm<sup>2</sup>  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 0  
 Number of Grid Openings (chrysotile) 0  
 Grid opening area 0.013 mm<sup>2</sup>  
 Volume (L) or Area (cm<sup>2</sup>) 739 L  
 Sensitivity (amphibole) s/cc  
 Sensitivity (chrysotile) s/cc  
 Area Examined (amphibole) 0.000 mm<sup>2</sup>  
 Area Examined (chrysotile) 0.000 mm<sup>2</sup>

**Recording Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK  
 Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00037 270900045-0009 ISO D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Overloaded

EPA Sample Number:	BA-00037
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	739
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0009
Number of grids prepared	
Prepared by	
Preparation date	
EPA COC Number	L14984

Analyzed by	
Analysis date	
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	Yes
Counting rules	ISO (Air or Dust)
Grid storage location	
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
17	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
17	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

## COMMENTS

Overloaded

**BNSF 2008 Libby Site Investigation v33**

### TEM Asbestos Structure Count

BA-00037\_270900045-0009\_ISO\_D.xls

EPA SAMPLE ID:

BA-00037

LAB SAMPLE ID:

270900045-0009

Sample Type

Air

### Count Rule

10312

Prep

Direct

QA Type

Not QA

## ERROR CHECK

OK - No errors found

Data Entry by:

L.Ramowski

Data Entry date:

4/20/2009

QA by:

T. Peters

QA date:

4/21/2009

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**
**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00037  
 QA Type Not QA  
 Lab Sample Number 270900045-0009  
 Sample Type Air  
 Category Field  
 Prep Indirect  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 360.0 mm<sup>2</sup>  
 Indirect factor 1.25E-01  
 Number of Grid Openings (amphibole) 39  
 Number of Grid Openings (chrysotile) 39  
 Grid opening area 0.013 mm<sup>2</sup>  
 Volume (L) or Area (cm<sup>2</sup>) 739 L  
 Sensitivity (amphibole) 7.69E-03 s/cc  
 Sensitivity (chrysotile) 7.69E-03 s/cc  
 Area Examined (amphibole) 0.507 mm<sup>2</sup>  
 Area Examined (chrysotile) 0.507 mm<sup>2</sup>

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024	39	50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK  
 Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00037 270900045-0009 ISO 04-17-09 1.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00037
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	739
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0009
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/17/2009
Prep	Indirect
If sample type = air, is there loose material or debris in the bowl?	Yes
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, I
Archive filter(s) storage location	Westmont
Enter the appropriate data in the cells to the right to calculate the F-factor >>>>>	
F- factor	0.125
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
125	GOs required to reach target sensitivity
39	Maximum # of GOs
50	Maximum # of Structure
39	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

0.5	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
100	First resuspension volume or rinsate volume (mL)
25	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
0.125	F-factor

Grid opening traverse direction:	V
----------------------------------	---

## COMMENTS

--



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00037\_270900045-0009\_ISO\_04-17-09 I.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00037  
270900045-0009

Sample Type	Air
Count Rule	10312

Prep	Indirect
QA Type	Not QA

ERROR CHECK

OK - No errors found

Data Entry by:

L. Ramowski

QA by:

T. Peters

Data Entry date:

4/20/2009

QA date:

4/21/2009

**Maximum # of Grid Openings Reached-Complete current GO then stop.**

[illegible]

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Overloaded  
 EPA Sample Number BA-00038  
 QA Type Not QA  
 Lab Sample Number 270900045-0010  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 0  
 Number of Grid Openings (chrysotile) 0  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 890 L  
 Sensitivity (amphibole) s/cc  
 Sensitivity (chrysotile) s/cc  
 Area Examined (amphibole) 0.000 mm2  
 Area Examined (chrysotile) 0.000 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		> .5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00038\_270900045-0010\_ISO\_D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Overloaded

EPA Sample Number:	BA-00038
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	890
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0010
Number of grids prepared	
Prepared by	
Preparation date	
EPA COC Number	L14984

Analyzed by	
Analysis date	
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	Yes
Counting rules	ISO (Air or Dust)
Grid storage location	
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## COMMENTS

Overloaded

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
14	GOS required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structures
14	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00038\_270900045-0010\_ISO\_D.xls

EPA SAMPLE ID:

BA-00038

LAB SAMPLE ID:

270900045-0010

Sample Type

**Air**

### Count Rule

10312

Prep

Direct

QA Type

Not QA

## ERROR CHECK

OK - No errors found

Data Entry by:

L. Ramowski

Data Entry date:

4/20/2009

QA by:

T. Peters

QA date:

4/21/2009

[illegible]



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00038  
 QA Type Not QA  
 Lab Sample Number 270900045-0010  
 Sample Type Air  
 Category Field  
 Prep Indirect  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 360.0 mm<sup>2</sup>  
 Indirect factor 2.50E-01  
 Number of Grid Openings (amphibole) 39  
 Number of Grid Openings (chrysotile) 39  
 Grid opening area 0.013 mm<sup>2</sup>  
 Volume (L) or Area (cm<sup>2</sup>) 890 L  
 Sensitivity (amphibole) 3.19E-03 s/cc  
 Sensitivity (chrysotile) 3.19E-03 s/cc  
 Area Examined (amphibole) 0.507 mm<sup>2</sup>  
 Area Examined (chrysotile) 0.507 mm<sup>2</sup>

**Recording  
Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping  
Rules:**

Target S	Max GOs	Max N
0.0024	39	50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>= .5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00038 270900045-0010 ISO 04-17-09 I.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00038
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	890
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0010
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/17/2009
Prep	Indirect
If sample type = air, is there loose material or debris in the bowl?	Yes
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, J
Archive filter(s) storage location	Westmont
Enter the appropriate data in the cells to the right to calculate the F-factor >>>>>	
F- factor	0.25
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
52	GOs required to reach target sensitivity
39	Maximum # of GOs
50	Maximum # of Structure
39	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

0.5	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
100	First resuspension volume or rinsate volume (mL)
50	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

0.25 F-factor

Grid opening traverse direction:	V
----------------------------------	---

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00038\_270900045-0010\_ISO\_04-17-09\_I.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00038  
270900045-0010

Sample Type	Air
Count Rule	10312

Prep	Indirect
QA Type	Not QA

### ERROR CHECK

OK - No errors found

Data Entry by:	L.Ramowski
Data Entry date:	4/20/2009

QA by:	T. Peters
QA date:	4/21/2009

**Maximum # of Grid Openings Reached-Complete current GO then stop.**

[illegible]

2	F8	ND
2	F10	ND
2	E1	ND
2	E3	ND

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00047  
 QA Type Not QA  
 Lab Sample Number 270900045-0011  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 11  
 Number of Grid Openings (chrysotile) 11  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 1154 L  
 Sensitivity (amphibole) 2.33E-03 s/cc  
 Sensitivity (chrysotile) 2.33E-03 s/cc  
 Area Examined (amphibole) 0.143 mm2  
 Area Examined (chrysotile) 0.143 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00047\_270900045-0011\_ISO\_04-17-09\_D.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00047  
270900045-0011

Sample Type	Air
Count Rule	10312

Prep	Direct
QA Type	Not QA

### ERROR CHECK

OK - No errors found

Data Entry by:	L.Ramowski
Data Entry date:	4/20/2009

QA by:	T. Peters
QA date:	4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00048  
 QA Type Not QA  
 Lab Sample Number 270900045-0012  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 11  
 Number of Grid Openings (chrysotile) 11  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 1165 L  
 Sensitivity (amphibole) 2.31E-03 s/cc  
 Sensitivity (chrysotile) 2.31E-03 s/cc  
 Area Examined (amphibole) 0.143 mm2  
 Area Examined (chrysotile) 0.143 mm2

**Recording  
Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping  
Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00048\_270900045-0012\_ISO\_04-17-09\_D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00048
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	1165
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0012
Number of grids prepared	5
Prepared by	E.Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/17/2009
Prep	Direct
if sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, L
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
11	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
11	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
	F-factor

Grid opening traverse direction:	V
----------------------------------	---

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00048\_270900045-0012\_ISO\_04-17-09\_D.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00048  
270900045-0012

Sample Type  
Count Rule

Air  
10312

Prep  
QA Type

Direct  
Not Q

Not QA

### ERROR CHECK

OK - No errors found

Data Entry by:

L.Ramowski

**Data Entry date:**

4/20/2009

QA by:

T.Peters

QA date:

4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00058  
 QA Type Not QA  
 Lab Sample Number 270900045-0013  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 25  
 Number of Grid Openings (chrysotile) 25  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 510 L  
 Sensitivity (amphibole) 2.32E-03 s/cc  
 Sensitivity (chrysotile) 2.32E-03 s/cc  
 Area Examined (amphibole) 0.325 mm2  
 Area Examined (chrysotile) 0.325 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK  
 Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1



FILE NAME: BA-00058 270900045-0013 ISO 04-17-09 D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00058
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	510
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0013
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/17/2009
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, M
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
25	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
25	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
	F-factor

Grid opening traverse direction:	V
----------------------------------	---

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00058\_270900045-0013 ISO 04-17-09 D.xls

EPA SAMPLE ID:

BA-00058

LAB SAMPLE ID:

270900045-0013

Sample Type

**Air**

### Count Rule

10312

Prep

Direct

QA Type

Not QA

ERROR CHECK

OK - No errors found

Data Entry by:

L. Ramowski

Data Entry date:

4/20/2009

QA by:

T. Peters

QA date:

4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00059  
 QA Type Not QA  
 Lab Sample Number 270900045-0014  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 25  
 Number of Grid Openings (chrysotile) 25  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 501 L  
 Sensitivity (amphibole) 2.36E-03 s/cc  
 Sensitivity (chrysotile) 2.36E-03 s/cc  
 Area Examined (amphibole) 0.325 mm2  
 Area Examined (chrysotile) 0.325 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00059 270900045-0014 ISO 04-17-09 D.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00059
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	501
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0014
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/17/2009
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, N
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Not QA

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
25	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
25	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

V

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00059\_270900045-0014\_ISO\_04-17-09\_D.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00059  
270900045-0014

Sample Type	Air
Count Rule	10312

Prep	Direct
QA Type	Not QA

### ERROR CHECK

OK - No errors found

Data Entry by:	L.Ramowski
Data Entry date:	4/20/2009

QA by:	T. Peters
QA date:	4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop**

[illegible]



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
EPA Sample Number 0  
QA Type LB  
Lab Sample Number 270900045  
Sample Type Air  
Category Blank  
Prep Indirect  
Counting Rules 10312

**PARAMETERS**

Effective filter area 360.0 mm2  
Indirect factor 1.00E+00  
Number of Grid Openings (amphibole) 10  
Number of Grid Openings (chrysotile) 10  
Grid opening area 0.013 mm2  
Volume (L) or Area (cm2) 0 L  
Sensitivity (amphibole) Blank s/cc  
Sensitivity (chrysotile) Blank s/cc  
Area Examined (amphibole) 0.130 mm2  
Area Examined (chrysotile) 0.130 mm2

**Recording Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping Rules:**

Target S	Max GOs	Max N
	10	50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a					
b					
c					
d					
e					
f					
Total					<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: 270900045\_ISO\_04-17-09\_ILB.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Blank
Filter Status	Analyzed

EPA Sample Number:	
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	
Date received by lab	
Lab Job Number:	270900045
Lab Sample Number:	270900045
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/17/2009
Prep	Indirect
If sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, O
Archive filter(s) storage location	Westmont
Enter the appropriate data in the cells to the right to calculate the F-factor >>>>	
F-factor	1
QA Type	Lab Blank

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

	Target Sensitivity GOS required to reach target sensitivity
10	Maximum # of GOs
50	Maximum # of Structure
10	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

1	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
100	First resuspension volume or rinsate volume (mL)
100	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

1 F-factor

Grid opening traverse direction:

V

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

270900045 ISO\_04-17-09\_ILB.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

0
270900045

Sample Type	Air
Count Rule	10312

Prep	Indirect
QA Type	LB

## ERROR CHECK

OK - No errors found

Data Entry by:

L. Ramowski

QA by:

T. Peters

Data Entry date:

4/20/2009

QA date:

4/21/2009

**Maximum # of Grid Openings Reached-Complete current GO then stop.**

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**
**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00021  
 QA Type RS  
 Lab Sample Number 270900045-0005  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm<sup>2</sup>  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 13  
 Number of Grid Openings (chrysotile) 13  
 Grid opening area 0.013 mm<sup>2</sup>  
 Volume (L) or Area (cm<sup>2</sup>) 988 L  
 Sensitivity (amphibole) 2.31E-03 s/cc  
 Sensitivity (chrysotile) 2.31E-03 s/cc  
 Area Examined (amphibole) 0.169 mm<sup>2</sup>  
 Area Examined (chrysotile) 0.169 mm<sup>2</sup>

**Recording  
Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping  
Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK

Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length &gt; 5 um, Width &gt;= 0.25 um, Aspect Ratio &gt;= 3:1

FILE NAME: BA-00021\_270900045-0005\_ISO\_04-17-09\_DRS.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00021
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	988
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0005
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	R. Pescador
Analysis date	4/17/2009
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, E
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Recount Same

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
13	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
13	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

V

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00021\_270900045-0005\_ISO\_04-17-09\_DRS.xls

EPA SAMPLE ID:  
LAB SAMPLE ID:

BA-00021  
270900045-0005

Sample Type	Air
Count Rule	10312

Prep	Direct
QA Type	RS

## ERROR CHECK

OK - No errors found

Data Entry by:	L.Ramowski
Data Entry date:	4/20/2009

QA by:	T. Peters
QA date:	4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count -- ISO 10312**

**SAMPLE ID**

Status Analyzed  
 EPA Sample Number BA-00047  
 QA Type RD  
 Lab Sample Number 270900045-0011  
 Sample Type Air  
 Category Field  
 Prep Direct  
 Counting Rules 10312

**PARAMETERS**

Effective filter area 385.0 mm2  
 Indirect factor 1.00E+00  
 Number of Grid Openings (amphibole) 11  
 Number of Grid Openings (chrysotile) 11  
 Grid opening area 0.013 mm2  
 Volume (L) or Area (cm2) 1154 L  
 Sensitivity (amphibole) 2.33E-03 s/cc  
 Sensitivity (chrysotile) 2.33E-03 s/cc  
 Area Examined (amphibole) 0.143 mm2  
 Area Examined (chrysotile) 0.143 mm2

**Recording**  
**Rules:**

Min. AR	Min length (um)	Min width (um)
≥ 3:1	0.5	none

**Stopping**  
**Rules:**

Target S	Max GOs	Max N
0.0024		50

**COUNTS (based on countable structures only)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	0	0	0		
b	0	0	0		
c	0	0	0		
d	0	0	0		
e	0	0	0		
f	0	0	0		
Total	0	0	0	0	0

Check OK OK OK  
 Grand total 0 OK

**CONCENTRATION (s/cc)**

Bin	LA	OA	C	PCME(all)	PCME(asb)
a	<DL	<DL	<DL		
b	<DL	<DL	<DL		
c	<DL	<DL	<DL		
d	<DL	<DL	<DL		
e	<DL	<DL	<DL		
f	<DL	<DL	<DL		
Total	<DL	<DL	<DL	<DL	<DL

Type	Bin	Length	Width	Aspect ratio
LA = Libby-type amphibole	a			<5
OA = Other amphibole	b	<.5		>= 5
C = Chrysotile	c		>.5	>= 5
	d	>=.5 to < 5	<=.5	>= 5
	e	5 to 10	<=.5	>= 5
	f	>10	<=.5	>= 5

PCME: Length > 5 um, Width >= 0.25 um, Aspect Ratio >= 3:1

FILE NAME: BA-00047\_270900045-0011\_ISO\_04-17-09\_DRD.xls

FILE TYPE: Original

## BNSF 2008 Libby Site Investigation v33

## TEM Asbestos Structure Count

Laboratory name:	EMSL27
Instrument	OL 100 CX II (27-2)
Voltage (KV)	100kv
Magnification	19,000x
Grid opening area (mm2)	0.0130
Scale: 1L =	1.000
Scale: 1D =	1.000
Primary filter area (mm2)	385.0
Secondary Filter Area (mm2)	360.0
Category	Field
Filter Status	Analyzed

EPA Sample Number:	BA-00047
Sample Type	Air
Air volume (L), dust sample area (cm2), or dustfall container area (cm2)	1154
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0011
Number of grids prepared	5
Prepared by	E.Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number	L14984

Analyzed by	E.Wyatt-Pescador
Analysis date	4/17/2009
Prep	Direct
If sample type = air, is there loose material or debris in the bowl?	No
Counting rules	ISO (Air or Dust)
Grid storage location	2709-BNS-38, K
Archive filter(s) storage location	Westmont
F- factor	1
QA Type	Recount Different

## Recording Rules:

≥ 3:1	Minimum Aspect Ratio
0.50	Minimum Length (um)
none	Minimum Width (um)

## Stopping Rules:

0.00240	Target Sensitivity
11	GOs required to reach target sensitivity
	Maximum # of GOs
50	Maximum # of Structure
11	Estimated # of GOs

## F-factor Calculation:

## Indirect Prep Inputs

Fraction of primary filter used for indirect prep or ashing  
[For dust and dustfall, enter 1.0]

First resuspension volume or rinsate volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

Second resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

Third resuspension volume (mL)

Volume applied to secondary filter (mL) or used for serial dilution

## Input for Ashing of Secondary Filter

Fraction of secondary filter used for ashing

F-factor

Grid opening traverse direction:

V

## COMMENTS

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

BA-00047 270900045-0011 ISO 04-17-09 DRD.xls

EPA SAMPLE ID:	BA-00047
LAB SAMPLE ID:	270900045-0011

Sample Type	Air
Count Rule	10312

Prep	Direct
QA Type	RD

### ERROR CHECK

OK - No errors found

Data Entry by:	L.Ramowski
Data Entry date:	4/20/2009

QA by:	T. Peters
QA date:	4/21/2009

**Target Sensitivity Reached-Complete current GO, then stop.**

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm2)	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm2)	385
Secondary Filter Area (mm2)	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00001
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm2), or dustfall container area (cm2)	1344
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0001
Number of grids prepared	
Prepared by	
Preparation date	
EPA COC Number:	9 L14584
Secondary filter pore size (um)	0.2

Analyzed by	
Analysis date	
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	
If sample type = air, is there loose material or debris in the cow? (Yes, No)	Yes
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

Recording Rules:

Minimum Aspect Ratio (circle one):

none       $\geq 3:1$        $\geq 5:1$

Minimum Length ( $\mu\text{m}$ ):      0.5

Minimum Width ( $\mu\text{m}$ ):      None

<u>Stopping Rules:</u>	
Target Sensitivity:	0.0024
Max # of GOs:	10
Target # of Structures:	50

F-Factor Calculation (Indirect Preps Only):  
Enter data in appropriate cells provided to the right---->

[illegible]

F-factor Calculation:	
Indirect Prep Inputs	
	Fraction of primary filter used for indirect prep or ashing <i>(For dust and dustfall, enter 1.0)</i>
	First resuspension volume or rinse volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
Inputs for Serial Dilutions	
	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)
Input for Ashing of Secondary Filter	
	Fraction of secondary filter used for ashing

NAM = Non-asbestos material

Are prepped grids acceptable for analysis? (circle one)    Yes    No

If No, explain:

V Vertical

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

Laboratory name:	FMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00001
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	1344
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0001
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	9 114684 4/17/09
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/16/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	I
If sample type = air, Is there loose material or debris in the cow? (Yes, No)	Yes
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, A
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

## F-Factor Calculation (Indirect Preps Only):

Enter data in appropriate cells provided to the right —&gt;

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>≥ 3:1</u> ≥ 5:1
Minimum Length (um)	0.5
Minimum Width (um)	None

<b>Stopping Rules:</b>	
Target Sensitivity	0.0024
Max # of GOs	39 R1 4/17
Target # of Structures	50

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J6	ND														
	J8	ND														
	J10	ND														
	I7	ND														
	H2	ND														
	H6	ND														
	H8	ND														
	H10	ND														
	G1	ND														
✓	G3	ND														

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal

V VerticalAre prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

## F-factor Calculation:

## Indirect Prep Inputs

0.5	Fraction of primary filter used for indirect prep or ashing (For dust and dustfall, enter 1.0)
100	First resuspension volume or rinsate volume (mL)
50	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

2709-BNS-38, A

[illegible]



[illegible]

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00002
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	1333
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0002
Number of grids prepared	
Prepared by	
Preparation date	
EPA COC Number:	9 L14584 4/20/09
Secondary filter pore size (um)	0.2

Analyzed by	
Analysis date	
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	
If sample type = air, is there loose material or debris in the bowl? (Yes, No)	Yes
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>3:1</u> ≥ 5:1
Minimum Length (um):	0.5
Minimum Width (um):	None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	
Target # of Structures:	50

F-Factor Calculation (Indirect Preps Only):

Enter data in appropriate cells provided to the right----&gt;

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	

F-factor Calculation:

Indirect Prep Inputs

	Fraction of primary filter used for indirect prep or ashing (For dust and dustfall, enter 1.0)
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal

V Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 DX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00002
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	1333
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0002
Number of grids prepared	5
Prepared by	E. Wyatt Pescador
Preparation date	4/15/2009
EPA COC Number:	L14784 9 4/15/09
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/16/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	I
If sample type = air, is there loose material or debris in the bowl? (Yes, No)	Yes
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, B
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

## F-Factor Calculation (Indirect Preps Only):

Enter data in appropriate cells provided to the right—&gt;

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>≥ 3:1</u> ≥ 5:1
Minimum Length (um):	0.5
Minimum Width (um):	None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	39
Target # of Structures:	50

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J2	ND														
	J4	ND														
	J6	ND														
	J8	ND														
	I3	ND														
	I5	ND														
	I7	ND														
	H2	ND														
	H4	ND														
	H6	ND														

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal

☒ V VerticalAre prepped grids acceptable for analysis? (circle one) ☒ Yes ☐ No

If No, explain:

## F-factor Calculation:

## Indirect Prep Inputs

0.5	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
100	First resuspension volume or rinsate volume (mL)
25	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

EMSL27

BA-00002

LAB JOB NUMBER

270900045

270900045-0002

**A**

Not QA

GRID STORAGE LOC.

2709-BNS-38, B

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

LAB NAME	EMSL27	EPA SAMPLE NO.	BA-00002	QA TYPE	Not QA	LAB JOB NUMBER	270900045
LAB SAMPLE NO.	270900045-0002	SAMPLE TYPE	A			GRID STORAGE LOC.	2709-BNS-38. B

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class				Sketch/Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
2	J2	ND														
	J4	ND														
	J6	ND														
	J8	ND														
	J10	ND														
	J1	ND														
	J3	ND														
	J5	ND														
	J7	ND														
	J9	ND														
	H2	ND														
	H4	ND														
	H6	ND														
	H8	ND														

*2/1/09*

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00011
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	706
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0003
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	L14584
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/16/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the bowl? (Yes, No)	NO
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, C
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>≥ 3:1</u> ≥ 5:1
Minimum Length (um):	0.5
Minimum Width (um):	None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	18
Target # of Structures:	50

**F-Factor Calculation (Indirect Preps Only):**

Enter data in appropriate cells provided to the right—>

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J1	ND														
	J3	ND														
	J5	ND														
	J7	ND														
	J9	ND														
	I2	ND														
	I4	ND														
	I6	ND														
	G2	ND														
	G4	ND														

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
V Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

**F-factor Calculation:**

**Indirect Prep Inputs**

	Fraction of primary filter used for indirect prep or ashing (For dust and dustfall, enter 1.0)
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

**Inputs for Serial Dilutions**

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

**Input for Ashing of Secondary Filter**

	Fraction of secondary filter used for ashing
--	--



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

LAB NAME

EMSL27

EPA SAMPLE NO.

BA-00011

QA TYPE

LAB JOB NUMBER

270900045

LAB SAMPLE NO.

270900045-0003

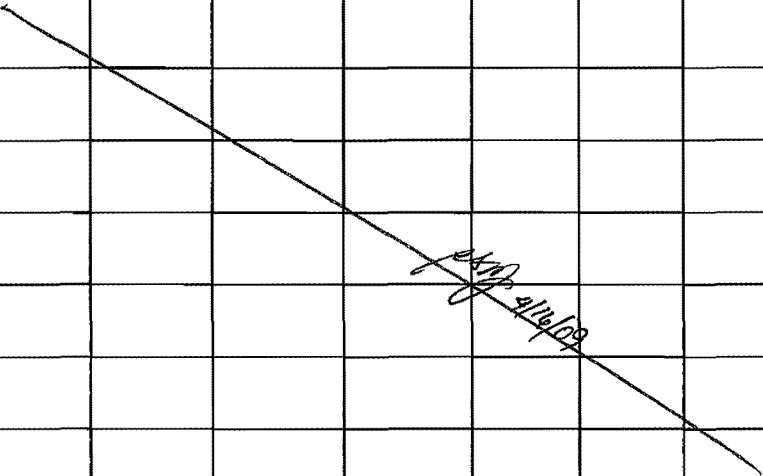
**SAMPLE TYPE**

**A**

**Not QA**

GRID STORAGE LOC.

2709-BNS-38, C

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class				Sketch/Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
2	G1	ND														
	G3	ND														
	G5	ND														
	G7	ND														
	G9	ND														
	E2	ND														
	E4	ND														
✓	EC	ND														
<div>  </div>																

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00012
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	687
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0004
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	9 L14584 4/17/09
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/16/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the bowl? (Yes, No)	NO Yes 4/17/09
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, D
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

**F-Factor Calculation (Indirect Preps Only):**

Enter data in appropriate cells provided to the right—>

<b>Recording Rules:</b>		
Minimum Aspect Ratio (circle one):		
none	≥ 3:1	≥ 5:1
Minimum Length (um):		0.5
Minimum Width (um):		None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	18
Target # of Structures:	50

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J2	ND														
	J4	ND														
	J6	ND														
	J8	ND														
	F2	ND														
	F4	ND														
	F6	ND														
	F8	ND														
	F10	ND														
2	J2	ND														

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
☒ V Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

**F-factor Calculation:**

**Indirect Prep Inputs**

	Fraction of primary filter used for indirect prep or ashing (For dust and dustfall, enter 1.0)
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

**Inputs for Serial Dilutions**

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

**Input for Ashing of Secondary Filter**

	Fraction of secondary filter used for ashing
--	--

LAB NAME	EMSL27	EPA SAMPLE NO.	BA-00012	QA TYPE	LAB JOB NUMBER	270900045
LAB SAMPLE NO.	270900045-0004	SAMPLE TYPE	A	Not QA	GRID STORAGE LOC.	2709-BNS-38, D

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class				Sketch/Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
2	I4	ND														
1	I6	ND														
	I8	ND														
	I10	ND														
	E1	ND														
	E3	ND														
	E5	ND														
	E7	ND														
<del>Redundant</del>																

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00021
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	988
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0005
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	L14784
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/16/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the cowl? (Yes, No)	NO
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, E
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

## F-Factor Calculation (Indirect Preps Only):

Enter data in appropriate cells provided to the right-----&gt;

Recording Rules:		
Minimum Aspect Ratio (circle one):		
none	≥ 3:1	≥ 5:1
Minimum Length (um):		0.5
Minimum Width (um):		None

Stopping Rules:	
Target Sensitivity:	0.0024
Max # of GOs:	13
Target # of Structures:	50

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J5	ND														
	J7	ND														
	J9	ND														
	H7	ND														
	H9	ND														
	D7	ND														
	D9	ND														
2	G1	ND														
	G3	ND														
	G5	ND														

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H  
Horizontal  
V  
Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

## F-factor Calculation:

## Indirect Prep Inputs

	Fraction of primary filter used for indirect prep or ashing (For dust and dustfall, enter 1.0)
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

LAB NAME

EMSL27

EPA SAMPLE NO.

BA-00021

QA TYPE

LAB JOB NUMBER

270900045

LAB SAMPLE NO.

270900045-0005

**SAMPLE TYPE**

**A**

Not QA

GRID STORAGE LOC. |

2709-BNS-38, E

[illegible]

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00022
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	1016
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0006
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	L14384
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the cow? (Yes, No)	ND
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, F
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

**F-Factor Calculation (Indirect Preps Only):**

Enter data in appropriate cells provided to the right----->

<b>Recording Rules:</b>		
Minimum Aspect Ratio (circle one):	none	≥ 3:1
Minimum Length (um):		0.5
Minimum Width (um):		None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	13
Target # of Structures:	50

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	I8	ND														
1	H9	ND														
1	F7	ND														
1	D5	ND														
1	D7	ND														
1	C8	ND														
1	C10	ND														
2	H1	ND														
1	H3	ND														
1	H5	ND														

**F-factor Calculation:**

**Indirect Prep Inputs**

Fraction of primary filter used for Indirect prep or ashing (For dust and dustfall, enter 1.0)
First resuspension volume or rinsate volume (mL)
Volume applied to secondary filter (mL) or used for serial dilution

**Inputs for Serial Dilutions**

Second resuspension volume (mL)
Volume applied to secondary filter (mL) or used for serial dilution
Third resuspension volume (mL)
Volume applied to secondary filter (mL)

**Input for Ashing of Secondary Filter**

Fraction of secondary filter used for ashing
--

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
V Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

LAB NAME

EMSL27

EPA SAMPLE NO.

BA-00022

QA TYPE

LAB JOB NUMBER

270900045

LAB SAMPLE NO.

270900045-0006

SAMPLE TYPE

A

Not QA

GRID STORAGE LOC.

2709-BNS-38, F

[illegible]

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00029
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	1145
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0007
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	9 L14384 4/15/09
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the cow? (Yes, No)	No Yes 4/17/09
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, G
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

## F-Factor Calculation (Indirect Preps Only):

Enter data in appropriate cells provided to the right----&gt;

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>≥ 3:1</u> ≥ 5:1
Minimum Length (um):	0.5
Minimum Width (um):	None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	11
Target # of Structures:	50

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J3	ND														
	J5	ND														
	J7	ND														
	J9	ND														
	C7	ND														
	C9	ND														
2	J6	ND														
	J8	ND														
	J10	ND														
	D7	ND														

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal

V VerticalAre prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

## F-Factor Calculation:

## Indirect Prep Inputs

	Fraction of primary filter used for Indirect prep or ashing (For dust and dustfall, enter 1.0)
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

LAB NAME

EMSL27

EPA SAMPLE NO.

BA-00029

QA TYPE

LAB JOB NUMBER:

270900045

LAB SAMPLE NO.

270900045-0007

**SAMPLE TYPE**

**A**

Not QA

GRID STORAGE LOC. [

2709-BNS-38, G

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00030
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	1145
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0008
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	9 L14584: 4/17/09
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the bowl? (Yes, No)	ND yes 4/17/09
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, H
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>≥ 3.1</u> ≥ 5:1
Minimum Length (um):	0.5
Minimum Width (um):	None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	11
Target # of Structures:	50

**F-Factor Calculation (Indirect Preps Only):**

Enter data in appropriate cells provided to the right---->

**F-factor Calculation:**

**Indirect Prep Inputs**

	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

**Inputs for Serial Dilutions**

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

**Input for Ashing of Secondary Filter**

	Fraction of secondary filter used for ashing
--	--

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	F2	ND														
	F4	ND														
	F6	ND														
	F8	ND														
	F10	ND														
	D6	ND														
	D8	ND														
2	F1	ND														
	F3	ND														
	F5	ND														

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal

8 Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

2709-BNS-38, H

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00037
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm2), or dustfall container area (cm2)	739
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0009
Number of grids prepared	
Prepared by	
Preparation date	
EPA COC Number:	9 11 L14684 4
Secondary filter pore size (um)	0.2

Analyzed by	
Analysis date	
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	
If sample type = air, is there loose material or debris in the cow? (Yes, No)	Yes
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

**F-Factor Calculation (Indirect Preps Only):**

Enter data in appropriate cells provided to the right----->

Recording Rules:

Minimum Aspect Ratio (circle one):

none	<u><math>\geq 3:1</math></u>	$\geq 5:1$
------	------------------------------	------------

Minimum Length ( $\mu\text{m}$ ):

0.5
-----

Minimum Width ( $\mu\text{m}$ ):

None
------

Stopping Rules:	
Target Sensitivity	0.0024
Max # of GOs	17
Target # of Structures	50

[illegible]

**F-factor Calculation:**

Indirect Prep Inputs	
	Fraction of primary filter used for indirect prep or ashing <i>[For dust and dustfall, enter 1.0]</i>
	First resuspension volume or rinse volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

### Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

### Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
V Vertical

Are prepped grids acceptable for analysis? (circle one)    Yes    No

If No, explain:



**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00037
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	739
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0009
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	L14384 4/17/09
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	DI 4/17/09
If sample type = air, is there loose material or debris in the cowl? (Yes, No)	Yes
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, I
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

**F-Factor Calculation (Indirect Preps Only):**

Enter data in appropriate cells provided to the right----->

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>3</u> $\geq 5:1$
Minimum Length (um):	0.5
Minimum Width (um):	None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	39
Target # of Structures:	50

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J1	ND														
	J3	ND														
	J5	ND														
	J7	ND														
	J9	ND														
	I2	ND														
	I4	ND														
	I6	ND														
	I8	ND														
	I10	ND														

**F-factor Calculation:**

**Indirect Prep Inputs**

0.5	Fraction of primary filter used for indirect prep or ashing (For dust and dustfall, enter 1.0)
100	First resuspension volume or rinsate volume (mL)
25	Volume applied to secondary filter (mL) or used for serial dilution

**Inputs for Serial Dilutions**

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

**Input for Ashing of Secondary Filter**

	Fraction of secondary filter used for ashing
--	--

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
☒ V Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

EMSL27

BA-00037

LAB JOB NUMBER

270900045

270900045-0009

A

Not QA

GRID STORAGE LOC.

2709-BNS-38, 1

[illegible]

LAB NAME	EMSL27	EPA SAMPLE NO.	BA-00037	QA TYPE	LAB JOB NUMBER	270900045
LAB SAMPLE NO.	270900045-0009	SAMPLE TYPE	A	Not QA	GRID STORAGE LOC.	2709-BNS-38, I

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class				Sketch/Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
2	H1	ND														
	H3	ND														
	H5	ND														
	H7	ND														
	H9	ND														
	G2	ND														
	G4	ND														
	G6	ND														
	G8	ND														
	G10	ND														
	F1	ND														
	F3	ND														
	F5	ND														
	F7	ND														
			RM 4/17/09													

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00038
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	890
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0010
Number of grids prepared	
Prepared by	
Preparation date	
EPA COC Number:	9 L14884
Secondary filter pore size (um)	0.2

Analyzed by	
Analysis date	
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	
If sample type = air, is there loose material or debris in the cow? (Yes, No)	Yes
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

F-Factor Calculation (Indirect Preps Only):

Enter data in appropriate cells provided to the right----->

Recording Rules:

Minimum Aspect Ratio (circle one):

none       $\geq 3:1$        $\geq 5:1$

Minimum Length ( $\mu\text{m}$ )      0.5

Minimum Width ( $\mu\text{m}$ )      None

Stopping Rules:

Target Sensitivity:	0.0024
Max # of GOs:	14
Target # of Structures:	50

[illegible]

F-factor Calculation:

Indirect Prep Inputs	
	Fraction of primary filter used for indirect prep or ashing (For dust and dustfall, enter 1.0)
	First resuspension volume or rinse volume (mL.)
	Volume applied to secondary filter (mL.) or used for serial dilution

### Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
V Vertical

Are prepped grids acceptable for analysis? (circle one)    Yes    No

If No, explain:

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00038
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	890
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0010
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	L14384 4/17/09
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	I
If sample type = air, is there loose material or debris in the cow? (Yes, No)	Yes
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, J
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

**F-Factor Calculation (Indirect Preps Only):**

Enter data in appropriate cells provided to the right----->

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>≥ 3:1</u> ≥ 5:1
Minimum Length (um):	0.5
Minimum Width (um):	None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	39
Target # of Structures:	50

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J4	ND														
	J6	ND														
	J8	ND														
	J10	ND														
	I1	ND														
	I5	ND														
	I7	ND														
	I9	ND														
	H4	ND														
	H6	ND														

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
7 Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

**F-factor Calculation:**

**Indirect Prep Inputs**

<u>0.5</u>	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
<u>100</u>	First resuspension volume or rinsate volume (mL)
<u>50</u>	Volume applied to secondary filter (mL) or used for serial dilution

**Inputs for Serial Dilutions**

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

**Input for Ashing of Secondary Filter**

	Fraction of secondary filter used for ashing
--	--

2709-BNS-38, J

[illegible]



LAB NAME

EMSL27

EPA SAMPLE NO.

BA-00038

QA TYPE

LAB JOB NUMBER

270900045

LAB SAMPLE NO.

270900045-0010

SAMPLE TYPE

**A**

Not QA

GRID STORAGE LOC.

2709-BNS-38, J

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00047
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	1154
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0011
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	L14384
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the bowl? (Yes, No)	No
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, K
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>≥ 3:1</u> ≥ 5:1
Minimum Length (um):	0.5
Minimum Width (um):	None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	11
Target # of Structures:	50

**F-Factor Calculation (Indirect Preps Only):**

Enter data in appropriate cells provided to the right----->

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J1	ND														
	J3	ND														
	J5	ND														
	J7	ND														
	J9	ND														
	D7	ND														
2	G4	ND														
	G6	ND														
	G8	ND														
	D8	ND														

**F-factor Calculation:**

**Indirect Prep Inputs**

	Fraction of primary filter used for indirect prep or ashing (For dust and dustfall, enter 1.0)
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

**Inputs for Serial Dilutions**

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

**Input for Ashing of Secondary Filter**

	Fraction of secondary filter used for ashing
--	--

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
☒ V Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

2709-BNS-38, K

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00048
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	1165
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0012
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	L14384
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the bowl? (Yes, No)	No
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, L
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

## F-Factor Calculation (Indirect Preps Only):

Enter data in appropriate cells provided to the right----&gt;

## Recording Rules:

Minimum Aspect Ratio (circle one):

none ≥ 3:1 ≥ 5:1

Minimum Length (um): 0.5

Minimum Width (um): None

## Stopping Rules:

Target Sensitivity: 0.0024

Max # of GOs: 11

Target # of Structures: 50

## F-factor Calculation:

## Indirect Prep Inputs

	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	I2	ND														
	I4	ND														
	I6	ND														
	I8	ND														
	I10	ND														
	E7	ND														
	E9	ND														
2	G1	ND														
	G3	ND														
	G5	ND														

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
 V Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

LAB NAME

EMSL27

EPA SAMPLE NO.

BA-00048

QA TYPE

LAB JOB NUMBER:

270900045

LAB SAMPLE NO.

270900045-0012

**SAMPLE TYPE**

A

Not QA

GRID STORAGE LOC.

2709-BNS-38, L

[illegible]

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm2)	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm2)	385
Secondary Filter Area (mm2)	366
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00058
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm2), or dustfall container area (cm2)	510
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0013
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	9 L14984 4/17/09
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the bowl? (Yes, No)	NO Yes 4/17/09
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, M
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

<u>Recording Rules:</u>	
Minimum Aspect Ratio (circle one):	none <u>≥ 3:1</u> ≥ 5:1
Minimum Length (um):	0.5
Minimum Width (um):	None

<u>Stopping Rules:</u>	
Target Sensitivity:	0.0024
Max # of GOs:	25
Target # of Structures:	50

F-Factor Calculation (Indirect Preps Only):

Enter data in appropriate cells provided to the right---->

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J1	ND														
	J3	ND														
	J5	ND														
	J7	ND														
	J9	ND														
	I2	ND														
	I4	ND														
	I6	NP														
	I10	ND														
	H1	ND														

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
V Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

F-factor Calculation:

Indirect Prep Inputs

	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
	First resuspension volume or rinse volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--



EMSL27

BA-00058

LAB JOB NUMBER

270900045

270900045-0013

A

Not QA

GRID STORAGE LOC.

2709-BNS-38, M

[illegible]

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00059
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	501
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0014
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	L14584 4/17/09
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the cowl? (Yes, No)	NO yes 4/17/09
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, N
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Not QA

## F-Factor Calculation (Indirect Preps Only):

Enter data in appropriate cells provided to the right-----&gt;

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>≥ 3:1</u> ≥ 5:1
Minimum Length (um):	0.5
Minimum Width (um):	None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	25
Target # of Structures:	50

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J2	ND														
	J4	ND														
	J6	ND														
	J8	ND														
	J10	ND														
	I1	ND														
	I3	ND														
	I5	ND														
	I7	ND														
	I9	ND														

## F-factor Calculation:

## Indirect Prep Inputs

	Fraction of primary filter used for indirect prep or ashing [For dust and dustfall, enter 1.0]
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

## Inputs for Serial Dilutions

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

## Input for Ashing of Secondary Filter

	Fraction of secondary filter used for ashing
--	--

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
 (V) Vertical

Are prepped grids acceptable for analysis? (circle one) yes No

If No, explain:

LAB NAME	EMSL27	EPA SAMPLE NO.	BA-00059	QA TYPE	LAB JOB NUMBER	270900045
LAB SAMPLE NO.	270900045-0014	SAMPLE TYPE	A	Not QA	GRID STORAGE LOC.	2709-BNS-38, N

[illegible]

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

**LB**

Laboratory name:	EMSL27
Instrument	JEOL-100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm2)	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm2)	385
Secondary Filter Area (mm2)	360
Category (Field, Rep., Dup., Blank)	Blank
Primary filter pore size (um)	0.8

EPA Sample Number:	
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm2), or dustfall container area (cm2)	
Date received by lab	
Lab Job Number:	270900045
Lab Sample Number:	270900045
Number of grids prepared	3
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	9 L14884 4/17/09
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	I
If sample type = air, is there loose material or debris in the cow? (Yes, No)	
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, O
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Lab Blank Not QA any 4/17/09

<b>Recording Rules:</b>	
Minimum Aspect Ratio (circle one):	none <u>≥ 3:1</u> ≥ 5:1
Minimum Length (um):	0.5
Minimum Width (um):	None

<b>Stopping Rules:</b>	
Target Sensitivity	
Max # of GOs:	10
Target # of Structures:	50

**F-Factor Calculation (Indirect Preps Only):**  
Enter data in appropriate cells provided to the right---->

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	I1	ND														
	I3	ND														
	I5	ND														
	I7	ND														
	I9	ND														
2	G2	ND														
	G4	ND														
	G6	ND														
	G8	ND														
	G10	ND														

<b>F-factor Calculation:</b>	
<b>Indirect Prep Inputs</b>	
<u>1.0</u>	Fraction of primary filter used for indirect prep or ashing (For dust and dustfall, enter 1.0)
<u>100</u>	First resuspension volume or rinsate volume (mL)
<u>100</u>	Volume applied to secondary filter (mL) or used for serial dilution
<b>Inputs for Serial Dilutions</b>	
	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)
<b>Input for Ashing of Secondary Filter</b>	
	Fraction of secondary filter used for ashing

LA = Libby-type amphibole      OA = Other (non-Libby type) amphibole      C = Chrysotile      NAM = Non-asbestos material

Grid opening traverse direction (circle one):  
H Horizontal  
V Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No  
If No, explain:

**BNSF 2008 Libby Site Investigation v33  
TEM Asbestos Structure Count**

*RS*

Laboratory name:	EMSL27
Instrument	JEOL 100 CX II (27-2)
Voltage (KV)	100
Magnification	19,000X
Grid opening area (mm <sup>2</sup> )	0.013
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm <sup>2</sup> )	385
Secondary Filter Area (mm <sup>2</sup> )	360
Category (Field, Rep., Dup., Blank)	Field
Primary filter pore size (um)	0.8

EPA Sample Number:	BA-00021
Sample Type (A=Air, D=Dust, DF = Dustfall):	A
Air volume (L), dust area (cm <sup>2</sup> ), or dustfall container area (cm <sup>2</sup> )	988
Date received by lab	4/14/2009
Lab Job Number:	270900045
Lab Sample Number:	270900045-0005
Number of grids prepared	5
Prepared by	E. Wyatt-Pescador
Preparation date	4/15/2009
EPA COC Number:	L14784 <i>9/17/09</i>
Secondary filter pore size (um)	0.2

Analyzed by	R. Pescador
Analysis date	4/17/2009
Method (D=Direct, I=Indirect, IA=Indirect, ashed)	D
If sample type = air, is there loose material or debris in the cow? (Yes, No)	No
Counting rules (ISO, AHERA, ASTM)	ISO
Grid storage location	2709-BNS-38, E
Archive filter(s) storage location	Westmont
QA Type (Not QA, Recount Same, Recount Different, Re-prep, Verified Analysis, Reconciliation, Lab Blank, Interlab)	Recount Same

<b>Recording Rules:</b>		
Minimum Aspect Ratio (circle one):		
none	<u>≥ 3:1</u>	≥ 5:1
Minimum Length (um):		0.5
Minimum Width (um):		None

<b>Stopping Rules:</b>	
Target Sensitivity:	0.0024
Max # of GOs:	13
Target # of Structures:	50

**F-Factor Calculation (Indirect Preps Only):**

Enter data in appropriate cells provided to the right----->

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/ Comments	1 = yes, blank = no			Fract. GO Chrys.
			Primary	Total	Length	Width		LA	OA	C	NAM		Sketch	Photo	EDS	
1	J5	ND														
	J7	ND														
	J9	ND														
	H7	ND														
	H9	ND														
	D7	ND														
	D9	ND														
2	G1	ND														
	G3	ND														
	G5	ND														

**F-factor Calculation:**

**Indirect Prep Inputs**

	Fraction of primary filter used for indirect prep or ashing (For dust and dustfall, enter 1.0)
	First resuspension volume or rinsate volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution

**Inputs for Serial Dilutions**

	Second resuspension volume (mL)
	Volume applied to secondary filter (mL) or used for serial dilution
	Third resuspension volume (mL)
	Volume applied to secondary filter (mL)

**Input for Ashing of Secondary Filter**

	Fraction of secondary filter used for ashing
--	--

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NAM = Non-asbestos material

Grid opening traverse direction (circle one):

H Horizontal  
V Vertical

Are prepped grids acceptable for analysis? (circle one) Yes No

If No, explain:

**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

LAB NAME

EMSL27

EPA SAMPLE NO.

BA-00021

QA TYPE

LAB JOB NUMBER

270900045

LAB SAMPLE NO.

270900045-0005

SAMPLE TYPE

**A**

Recount Same

GRID STORAGE LOC.

2709-BNS-38, E

[illegible]



**BNSF 2008 Libby Site Investigation v33**  
**TEM Asbestos Structure Count**

LAB NAME

EMSL27

EPA SAMPLE NO.

BA-00047

QA TYPE

LAB JOB NUMBER

270900045

LAB SAMPLE NO.

270900045-0011

**SAMPLE TYPE**

A

Recount Different

GRID STORAGE LOC.

2709-BNS-38, K

[illegible]

## Chain of Custody Record

## Libby Asbestos Investigation

No. L14984

From: CDM

60 Port Blvd, Ste. 200

Libby, MT 59923

U.S. Environmental Protection Agency, Region VIII  
1595 Wynkoop Street  
Denver, CO 80202-1129

Send to: EMSL-Mobile Lab

107 W 4th St

Libby, MT 59923

via: ☒ hand delivery ☐ shipped

Date Shipped: 4/14/2009

Carrier Name: Hand-delivered

Airbill: NA

270900045

Sample Placed in Cooler/Bag	Index ID	Suffix ID	Sample Date	Sample Media (S=Soil; W=Water; D=Dust; A=Air; B=Bulk Insulation)	Volume (L) or Area (cm2)	Filter Pore Size (um)	Turn Around Time	Analysis Request	Comments	Sample Received by Lab
<input checked="" type="checkbox"/>	BA-00001		9/17/2008	A	1344 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00002		9/17/2008	A	1333 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00011		9/18/2008	A	706 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00012		9/18/2008	A	687 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00021		9/19/2008	A	988 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00022		9/19/2008	A	1016 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00029		9/22/2008	A	1145 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00030		9/22/2008	A	1145 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00037		9/23/2008	A	739 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00038		9/23/2008	A	890 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00047		9/24/2008	A	1154 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00048		9/24/2008	A	1165 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00058		9/25/2008	A	510 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	BA-00059		9/25/2008	A	501 L	0.8	10 Day	TEM-ISO10312 (ISO 10312:1995 (E))	#OU6RW1008-A	<input checked="" type="checkbox"/>

Total Number of Samples 14

END OF SUBMITTAL

Additional Comments:

Please see attachment

<i>[Signature]</i> Com Relinquished by (Signature and Company)	4-14-09 1611 Date/Time	<i>[Signature]</i> J. Whatt Peracoda/EMSL Received by (Signature and Company)	4/14/09/1611 Date/Time	OK & accept Sample Condition upon Receipt
<i>[Signature]</i> J. Whatt-Peracoda/EMSL Relinquished by (Signature and Company)	6/8/09/1255 Date/Time	 Received by (Signature and Company)	 Date/Time	Sample Condition upon Receipt
 Relinquished by (Signature and Company)	 Date/Time	 Received by (Signature and Company)	 Date/Time	Sample Condition upon Receipt